Remedy Selection Report

Martin Lake Steam Electric Station A1 Area Landfill
Panola County, Texas

Submitted to:

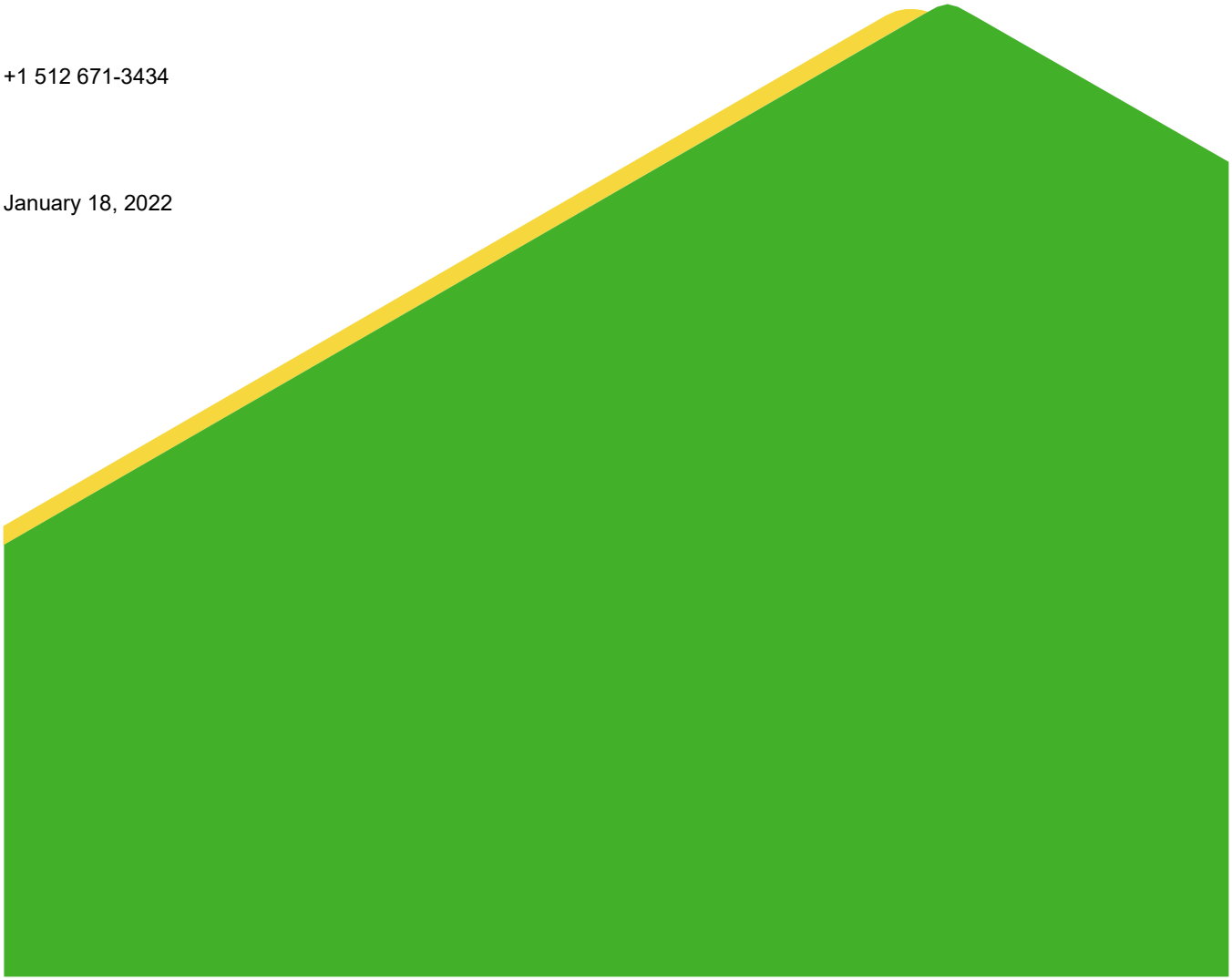
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January 18, 2022



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.



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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 A1 Area Landfill located at the Beckville Lignite Mine, approximately 5 miles southeast of Tatum in Panola County, Texas (hereafter, the "Site") (**Figure 1**). Luminant manages coal combustion residuals (CCR) generated from the Martin Lake Steam Electric Station (MLSES) in the A1 Area Landfill 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 40 C.F.R. § 257.97.

The initial assessment monitoring event was performed at the Site in 2018 in accordance with § 257.95(a) and § 257.95(d). The Appendix IV data collected during the assessment monitoring period through September 2018 identified statistically significant levels (SSLs) above groundwater protective standards (GWPSs) for arsenic, barium, cobalt, and lithium. Based on the statistical analysis of Appendix IV groundwater data collected through 2021, which was performed in compliance with the USEPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities-Unified Guidance (USEPA 2009), cobalt is the only Appendix IV constituent currently present in groundwater at the Site at SSLs above GWPSs. In response to the SSLs identified in 2018, an Assessment of Corrective Measures (ACM) Report was completed for the A1 Area Landfill in September 2019 as required by § 257.96 (Golder 2019a). Although cobalt is the only Appendix IV constituent currently identified at SSLs above GWPSs, the ACM evaluated arsenic, barium, cobalt, and lithium based on the SSLs initially identified in 2018.

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 A1 Area Landfill is located at the Beckville Lignite Mine, approximately 2.5 miles southeast of the MLSES in Panola County, Texas (**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 A1 Area Landfill is located within reclaimed areas of the former Beckville Lignite Mine (a subsection of the Martin Lake Lignite Mine).

The CCR groundwater monitoring well network at the A1 Area Landfill was established in 2015 and consists of monitoring wells BMW-11A-R, BMW-18, BMW-19, BMW-20, BMW-21, BMW-22, BMW-23, BMW-24, BMW-26, BMW-27, BMW-28, and BMW-33. The uppermost groundwater-bearing unit (GWBU) occurs under unconfined conditions within the previously mined spoil zone above native Wilcox material.

Golder performed a survey of water supply wells located in the vicinity of the A1 Area Landfill 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 2, 2019. No imminent threats to water supply wells or potentially affected drinking water wells were identified.

3.0 SOURCE CONTROL MEASURES

Progressive capping/closure of the A1 Area Landfill is performed as placement of CCR in the landfill reaches design elevations. Existing capped areas have been capped/closed using a 3-foot thick compacted clay cap (in-place permeability of $1x10^{-7}$ cm/sec or less) covered with a minimum 2-foot thick vegetative cover layer (PBW 2016). In 2020, Luminant received TCEQ approval to modify the cap configuration for future capped/closed areas of the A1 Area Landfill to consist of a 2-foot thick compacted mine spoil liner layer (in-place permeability of $1x10^{-7}$ cm/sec or less) covered with a 1.5-foot thick vegetative soil cover layer.

The landfill is lined with a 1-foot thick compacted clay bottom liner consisting of clay-rich mine spoil scarified and re-compacted to achieve an in-place permeability of $1x10^{-7}$ cm/sec or less. The bottom liner is underlain by low-permeability, clay-rich mine spoil 70 to 100 feet or more in thickness.

The landfill is surrounded by earthen embankments constructed of mine spoil that extend approximately 10 to 20 feet or more above surrounding grade. The earthen embankments are provided with a 3-foot thick compacted clay liner.

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 unit. 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 required 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 2021a). 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 arsenic, barium, cobalt, and lithium is occurring at the Site. Concentrations of these constituents in groundwater are stable or decreasing 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 Site.

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 anticipated to prevent 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 will 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 immediate vicinity of the A1 Area Landfill. The Drinking Water Survey Report (Golder 2019b) completed at the Site indicated the CCR unit poses no imminent threats to water supply wells.

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

The selected remedy will require a substantial period of time to achieve GWPSs (up to approximately 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 because it does not include excavation, transportation, or re-disposal of CCR. Access to the CCR unit and surrounding land are controlled by Luminant. Potential exposure due to containment of 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 precipitation into the capped CCR unit and leaching 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 comply with the requirements of § 257.70. 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 potentially affected water supply wells completed within the GWBU below or downgradient of the CCR unit. 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
Ongoing	Upon completion of CCR placement in A1 Area Landfill (date undetermined)	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), arsenic, barium, cobalt, and lithium concentrations are stable and the aquifer has adequate capacity to attenuate these constituents. The estimated time to reach GWPSs is approximately 50 years for cobalt and lithium and <2.5 years for arsenic and barium. This attenuation timeframe is based on predictive geochemical modeling using PHAST (Parkhurst et al., 2010) that assumes implementation of source control and increased source concentrations that are higher than actual measured CCR unit porewater concentrations, which were needed to achieve model calibration. It is important to note that arsenic, barium, and lithium are not currently identified at SSLs, and are expected to remain below GWPSs with the implementation of source control measures.

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 2021b) 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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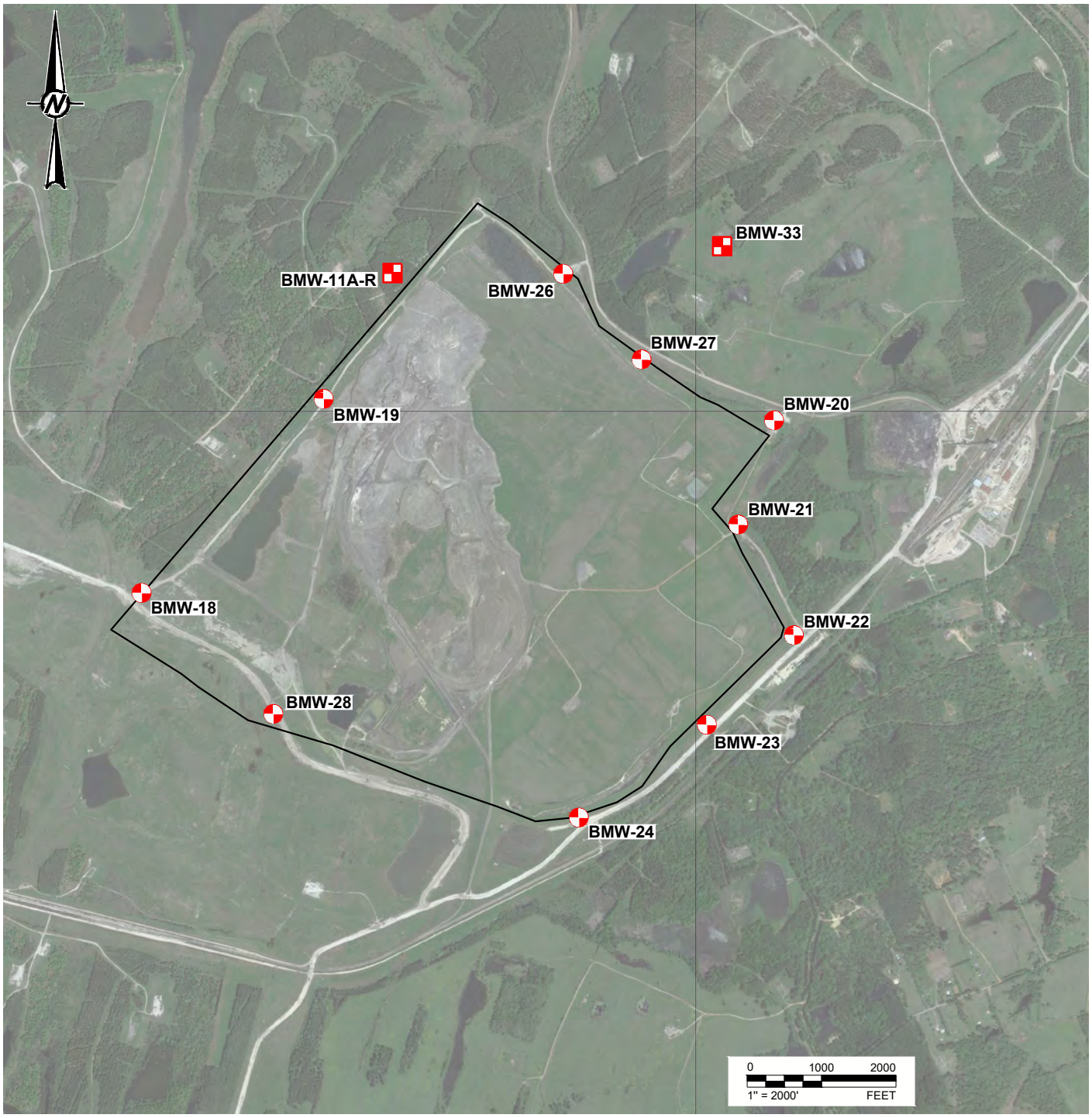
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FIGURES



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 - A1 AREA LANDFILL

CONSULTANT
GOLDER

YYYY-MM-DD	2021-01-11
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	CONTROL	REV.	FIGURE
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APPENDIX A

Tier I Monitored Natural Attenuation Evaluation

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 A1 LANDFILL 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 A1 Area Landfill (A1 LF) located near the Martin Lake Steam Electric Station (MLSES) in Panola 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, arsenic, barium, cobalt, and lithium are candidates for MNA at the MLSES A1 LF area per 40 Code of Federal Regulations (CFR) Part 257 as amended (CCR Final Rule). All four 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 for those constituents that are observed in groundwater at an SSL.

2.0 APPROACH

To assess the feasibility of MNA at the MLSES A1 LF at the Tier 1 MNA screening level, samples of overburden, groundwater, and porewater were collected in May and 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 arsenic, barium, cobalt, and lithium.
- Mineralogical analysis of overburden to identify and quantify the major mineral components.

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- 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 A1 LF area.

2.1 Groundwater and Porewater Sampling and Analysis

2.1.1 Sample Collection

Golder personnel collected groundwater samples from the background wells, downgradient or "monitoring" wells, and the nature and extent delineation wells, as presented in Table 1. The nature and extent of the plume were fully delineated in accordance with 40 CFR §257.95(g) (Golder 2019).

2.1.2 Geochemical Analysis

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

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

Metals: Analysis of Appendix III and IV metals concentrations was conducted to understand the geochemical composition of groundwater and porewater. 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 porewater 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 and porewater quality, determine the potential for precipitation of sorbent media, evaluate the potential for mineral precipitation or adsorption in the aquifer, and determine the speciation of metals of interest. The geochemical computer code developed by the 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. arsenic, barium, 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 and porewater quality data from a sampling event conducted from May 15 to July 8, 2019 were evaluated. This sampling event was selected because all wells related to the MLSES A1 LF 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, arsenic, barium, cobalt, and lithium in groundwater made use of all available sampling events from a well (up to 12 samples from some wells), dating back to October 2015.
- **Porewater chemistry:** The porewater sample collected from the MLSES A1 LF CCR unit is assumed to be representative of porewater found in the CCR unit.

- **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 and porewater 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

The A1 LF is located within reclaimed areas of the former Beckville Lignite Mine. A drilling contractor collected continuous cores from four assessment locations downgradient of the CCR monitoring well network and one background location. The assessment locations (BMW-29, BMW-30, BMW-31, and BMW-32) surround the current CCR monitoring network (Golder 2019). The background boring (BMW-33), also outside the CCR well network, is upgradient with respect to groundwater flow direction (Golder 2019). Golder staff collected overburden samples from drill cores obtained at various intervals at the five locations ranging from 14 feet below ground surface (bgs) to up to 41 feet bgs. The core samples are representative of the uppermost water-bearing unit within the spoiled overburden interval, which is underlain by native lignite or silty clay.

The 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 (e.g., BMW-29 (30'-31'). 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 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 (COIs) 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 COIs (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 AND POREWATER CHARACTERIZATION

Comprehensive water quality data from background wells BMW-11AR, BMW-27, and BMW-33; monitoring wells BMW-18, BMW-19, BMW-20, BMW-21, BMW-22, BMW-23, BMW-24, BMW-26, and BMW-28; nature and extent wells BMW-25, BMW-29, BMW-30, BMW-31, and BMW-32; and porewater sample S-1 were used for this evaluation. For background wells AI-17-SPOIL and AIV-18-OB-95 and nature and extent well AI-2-OB, the only water quality information available was for constituents of concern. 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 network and nature and extent wells ranged from 6.6 to 7.2 in May 2019. Historically, the pH in the CCR monitoring well network has ranged from 5.3 to 7.3, with the majority of values falling between 6.0 and 7.2. The pH of porewater was 6.6 in May 2019.
- ORP (Redox): Field-measured redox values, corrected to Eh (+200mV), ranged from +123 to +184 mV in the groundwater samples in the CCR monitoring well network in May 2019. The Eh of groundwater in the nature and extent monitoring wells ranged from +168 mV to +190 mV, indicating that redox conditions were similar to those in the CCR monitoring network wells. The redox of porewater was not measured during sampling.
- Total Dissolved Solids (TDS): Groundwater TDS concentrations were variable in May 2019 in the CCR monitoring and nature and extent well network. The lowest TDS concentration (327 mg/L) was observed in nature and extent monitoring well BMW-31 and the highest TDS concentration (3,610 mg/L) was reported from CCR monitoring wells BMW-28. Groundwater in CCR monitoring well BMW-28, while having the highest TDS, does not have an SSL of any Appendix IV constituent as of May 2019. The TDS observed in porewater was higher than that of groundwater at 4,220 mg/L.

[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.

- Major ion chemistry: A Piper plot was generated for groundwater samples to facilitate the identification of water types and source contributions (Figure 1). Except for upgradient wells BMW-18, BMW-19 and nature and extent well BMW-31, all background, downgradient, and nature and extent wells demonstrate a similar major ion relative abundance. Generally, groundwater is sodium-bicarbonate or sodium sulfate dominated. Porewater is of the sodium sulfate type. BMW-11AR is the only well with groundwater that is calcium dominated, classified as the calcium bicarbonate type.

- Iron: Oxidized iron (Fe^{+3}) concentrations were variable, ranging from 0.0633 mg/L (BMW-28) to 35.1 mg/L (BMW-24) in May 2019 (Appendix B). Reduced iron (Fe^{+2}) was non-detect (<0.05 mg/L) in all groundwater samples but two: BMW-23 (0.0937 mg/L) and nature and extent well BMW-29 (0.342 mg/L). Porewater iron was predominately reduced (10.5 mg/L Fe^{+2} at a total iron concentration of 16.6 mg/L). Based on the oxidized iron concentrations in groundwater surrounding the CCR unit, it is likely ferrihydrite, an iron hydroxide mineral, is present at the A1 LF, indicating the potential for attenuation of metals and metalloids from groundwater. Iron present in porewater may also cause iron-bearing minerals to form, thereby providing opportunity for attenuation of constituents of concern.

- Nutrients: Nitrate (nitrate as N) was present in groundwater at monitoring wells at variable levels, ranging from non-detect (< 0.1 mg/L as N) to 1.35 mg/L as N at BMW-19 in May 2019 (Appendix B). Nitrate was not detected in nature and extent wells or porewater. Phosphate concentrations in groundwater ranged from non-detect (0.03 mg/L) to 0.202 mg/L in CCR monitoring and nature and extent wells. Porewater phosphate was just above detection at 0.045 mg/L. No spatial trend was apparent in the nitrate or phosphate distribution in groundwater.

Constituents Identified in February 2019 SSL Notification

- Arsenic: Historically, arsenic concentrations in groundwater surrounding the A1 LF have ranged from non-detect (<0.002 mg/L) to 0.0428 mg/L in CCR monitoring well BMW-19 (June 2018; Figure 2a). Only CCR monitoring wells BMW-19 and BMW-26 have ever exceeded the GWPS. Prior to and after the highest groundwater arsenic concentration measured in BMW-19 in June 2018, arsenic concentrations were at or near detection limits in BMW-19 (<0.005 mg/), indicating that the elevated value likely represented an outlier. Arsenic concentrations in groundwater from BMW-26 exceeded the GWPS on four of 12 sampling occasions since October 2016. Based on the evaluation of 95% confidence intervals, no CCR monitoring wells contain arsenic at a concentration above the SSL as of May 2019. Arsenic was below its detection limit in porewater. All arsenic concentrations in CCR monitoring wells were below the GWPS as of May 2019. Arsenic is likely present in groundwater as arsenate, the cation As^{+5}, while based on the pH and Eh of groundwater, ferrihydrite, an iron hydroxide mineral phase known to adsorb arsenic, is expected to be present and stable (Figure 3a). The redox condition for porewater was estimated from the measured Fe^{+2}/Fe^{+3} redox couple.

- Barium: Historically, barium concentrations in groundwater have only exceeded the GWPS of 2.0 mg/L in CCR monitoring well BMW-19 (Figure 2b) on one occasion. Since October 2015, the barium concentration in groundwater at BMW-19 has ranged from 0.181 mg/L to 2.19 mg/L and, as of May 2019, was observed at 0.221 mg/L. No other nature and extent or CCR monitoring wells have ever reported barium concentrations in groundwater exceeding the GWPS. Based on the evaluation of 95% confidence intervals, barium in groundwater is not at an SSL in groundwater at BMW-19, or in any other CCR monitoring well. Porewater barium was measured at 0.0191 mg/L in May 2019, two orders of magnitude lower than the GWPS. Barium

is likely present in groundwater as the divalent cation Ba^{+2} based on the pH and Eh of groundwater (Figure 3b).

- Cobalt: Cobalt concentrations in groundwater samples collected from the nature and extent monitoring wells ranged from non-detect (<0.003 mg/L) to just above non-detect (0.00705 mg/L) in May 2019. The highest observed cobalt concentration in groundwater at a CCR well occurred at monitoring well BMW-24 (0.00643 mg/L; Figure 2c). All other CCR monitoring wells did not contain cobalt concentrations above the detection limit in May 2019. Groundwater at background monitoring well BMW-33 contained cobalt at a concentration of 0.0176 mg/L in May 2019. Historically, cobalt concentrations have ranged from non-detect (<0.003 mg/l) to 0.2550 mg/L in CCR monitoring well BMW-22. The highest cobalt concentration in this well was observed in June 2017, and since then levels have been generally stable or decreasing. CCR monitoring well BMW-24 shows substantial variation in cobalt concentration between sampling events, of +/- 0.2 mg/L in some cases. Based on an evaluation of 95% confidence intervals, CCR monitoring wells BMW-20 and BMW-27 contain cobalt at an SSL above the GWPS of 0.0124 mg/L (Golder 2019). Cobalt was measured in porewater at 0.0388 mg/L in May 2019. Cobalt is likely present in groundwater as the divalent cation Co^{+2},while based on the pH and Eh of groundwater, ferrihydrite, an iron hydroxide mineral phase known to adsorb cobalt, is expected to be present and stable (Figure 3c).

- Lithium: Lithium has exceeded the GWPS (0.103 mg/L) since October 2015 in groundwater from four wells: BMW-18, BMW-23, BMW-26, and BMW-28 (Figure 2d). In May 2019, lithium concentrations in groundwater in the CCR monitoring wells network were only above the GWPS in one well: BMW-28 (0.119 mg/L). The lithium concentration measured in porewater was an order of magnitude lower, 0.0161 mg/L, in May 2019. Based on the evaluation of the 95% confidence intervals, the GWPS exceedances for lithium in BMW-24 are not at an SSL above the GWPS for lithium, nor in any other CCR monitoring well at the A1 LF. Lithium is likely present in groundwater as the monovalent cation Li^{+} based on the pH and Eh of groundwater (Figure 3d).

3.1 Geochemical Modeling Results

The results of speciation modeling of groundwater from background, CCR monitoring wells, nature and extent delineation wells, and porewater 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 and porewater samples, indicating a strong potential for ongoing precipitation of solid phase iron oxides. Thus, throughout the A1 LF, the prevalence of iron oxides is assumed.

- **Other minerals:** All groundwater samples in which barium was determined and the porewater sample were in equilibrium with respect to barite [$BaSO_4$]. Gypsum [$CaSO_4{:}2H_2O$] was in equilibrium with groundwater in well BMW-19, BMW-28, and with porewater (S-1). Calcite [$CaCO_3$] was in equilibrium with all groundwater and porewater samples except with groundwater from wells BMW-18, BMW-24, and BMW-31.

In summary, barite, calcite, ferrihydrite, and gypsum contribute to controlling groundwater composition at some or all of the monitoring wells and in porewater. 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 five overburden samples collected during the drilling activities - one sample from each of the soil borings completed in May 2019 (BMW-29, BMW-30, BMW-31, BMW-32, and BMW-33). These samples were obtained to better understand the mineralogical composition of the aquifer system and identify any minerals that would potentially influence attenuation of COIs. In contrast, the presence of certain minerals could also indicate a potential for naturally-occurring release of metals into groundwater, for instance due to oxidation of sulfide minerals.

The mineralogical analysis identified the materials in boreholes samples at the A1 LF predominately consist of quartz with varying amounts of the silicate minerals albite, chlorite, K-feldspar, muscovite and illite. Although clay-specific XRD analysis was not conducted, the clay minerals vermiculite, kaolinite and montmorillonite were tentatively identified in addition to the illite. Trace levels of titanomagnetite and ilmenite were also identified in sample BMW-30 (the deepest sample tested). However, even without clay-specific XRD analysis, the presence of clays at the A1 LF 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 COIs over various operationally-defined fractions comprising the overburden. This testing was completed per Table 1 on overburden from five 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 COI at the site but it has been well studied as a sorbing medium in soils (e.g., Karamalidis and Dzombak 2011). Total aluminum in soils ranged from 29,526 to 53,368 mg/kg, and the environmentally-available fraction ranged from just 1,208 mg/kg (BMW-30) to 3,286 mg/kg (BMW-29). Aluminum in the soil at the site is, therefore, largely (~84% to 94%) present in the residual, or silicate-bound fraction (Figure 4). This fraction is likely at least partially represented by hydrous aluminum phyllosilicates minerals or clays intermixed in the silica sand matrix. Clays represent an important sorptive reservoir for numerous trace metals and metalloids (Uddin 2017).
- Iron: While not a COI, iron and its minerals commonly represent one of most abundant reservoirs for metal/metalloid attenuation in soils (Dzombak and Morel 1990; Smith 1999). Iron was present in all three core samples analyzed, varying from 5,814 mg/kg (BMW-30) to 24,578 mg/kg (BMW-29). In nearly all samples (except BMW-29 and BMW-31), the sulfide and residual fractions accounted for the largest proportion of total iron (59% to 79%) and, as such, most of the iron is not environmentally available (Figure 5). The remainder of the iron in the samples is present in the amorphous metal and metal hydroxide phase

with a small amount <0.6% also occurring in the carbonate fraction. The metal hydroxide fraction, part of the labile fraction in steps 1 through 5, can generally be considered representative of the amount of iron in soil that may be available as a sorbing medium and can, therefore, be used as a proxy for determine the potential for attenuation of cobalt or other COIs.

Constituents Identified with an SSL Notification

- Arsenic: Total arsenic in soil ranged from 3.0 to 4.12 mg/kg while the environmentally-available fraction ranged from 1.38 mg/kg in BMW-31 to 2.27 mg/kg in BMW-29, representing from 46% to 65% of total arsenic (Figure 6). Arsenic in the non-environmentally available fraction (acid/sulfide and residual fractions) ranged from 35% to 54% of total arsenic, demonstrating the presence of a reservoir of naturally-occurring arsenic in soils. All of the arsenic that was present in the environmentally-available fraction was associated with the amorphous metal and metal hydroxide fractions, indicating potential attenuation of arsenic from groundwater.
- Barium: Total barium in soil ranged from 376 to 597 mg/kg while the environmentally-available fraction ranged from 9.9 mg/kg in BMW-30 to 52 mg/kg in BMW-31, representing from 3% to 14% of total barium. The majority of barium (83% to 96%) was present in the silicate mineral or residual fraction, as such indicating the presence of a considerable reservoir of naturally-occurring barium in soils (Figure 7). Of the barium that resided in the environmentally-available fraction, the majority was associated with metal hydroxides, indicating potential attenuation of barium from groundwater.
- Cobalt: Total cobalt in soil ranged from 1.7 to 20 mg/kg while the environmentally-available fraction ranged from 0.66 mg/kg in BMW-32 to 18.8 mg/kg in BMW-31, representing from 39% to 94% of total cobalt (Figure 8). Environmentally-available cobalt was present in all fractions across the A1 LF. In BMW-31, which contained the highest cobalt concentration measured in the overburden samples, the amorphous metal and metal hydroxide fractions accounted for all of the environmentally-available cobalt, indicating its potential attenuation.
- Lithium: Total lithium in soil ranged from 11.7 to 24.7 mg/kg, of which between only 12% and 27% of the lithium occurred in the environmentally-available fraction (Figure 9). Lithium that was environmentally available (1.7 to 6.7 mg/kg), was all present in the metal hydroxide fraction. This distribution of lithium indicates the likelihood of the presence of naturally-occurring lithium contained within the non-environmentally available fractions as well as attenuation of lithium by metal hydroxide minerals.

Based on the above results, attenuation of all four 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 arsenic, barium, 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 A1 LF:

- **Plume Stability:** Based on the water quality monitoring data presented in this assessment, groundwater concentrations of arsenic, barium, cobalt, and lithium outside of the CCR unit are relatively stable or decreasing. Arsenic, barium, and lithium are unlikely to originate from the CCR unit due to their complete absence or presence in porewater at concentrations below the GWPS. It is also considered likely that cobalt in groundwater does not originate from the CCR unit as its concentration was much lower in porewater than in some groundwater in the CCR monitoring well network. As of the most recent sampling (May 2019), no CCR monitoring network well exceeded the GWPS for cobalt.

- **Magnitude of Exceedances**: Occasional exceedances of the arsenic, barium, and lithium GWPS in some wells do not amount to levels that would be considered an SSL per the CCR Rule (Golder 2019). The highest level of cobalt in groundwater (since monitoring began) at the A1 LF was observed in well BMW-27 (0.255 mg/L on June 29, 2017). During the next sampling round, cobalt in groundwater from BMW-27 was below the detection limit (<0.003 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.

- **Porewater:** Historical records are not available for ash additions or pore water concentrations over the lifespan of the CCR unit. However, based on recent porewater data, arsenic is not present in the CCR unit at levels above its detection limit. Barium and lithium were observed in porewater at concentrations well below their respective GWPS's. This indicates that porewater from the CCR unit is not likely to be a current source for these metals. Cobalt in porewater was measured at a concentration of 0.0.0388 mg/L in May 2019, well below the level that is observed in groundwater when a periodic exceedance occurs in BMW-20 or BMW-27. This indicates that porewater not likely to be a source for the SSL of cobalt in groundwater at these wells. Arsenic, barium, and lithium are currently not at an SSL in groundwater based on a 95% confidence interval at any CCR monitoring well (ACM report).

- **Groundwater Chemistry:** The groundwater monitoring results and the findings of the geochemical modeling support the potential for natural attenuation of arsenic, barium, 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 arsenic, barium, cobalt, and lithium in overburden at the MLSES A1 LF. Further, differences in relative abundance of the major ions in groundwater indicate that porewater is geochemically distinct from groundwater while the three wells with the most similar groundwater to porewater, BMW-19, BMW-22, and BMW-24, have never reported any constituent at a SSL.

- **Confirmation of Attenuation/Immobilization:** Based on both mineralogical and chemical analysis, it is evident that attenuation of arsenic, barium, 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, consistent with the inferred presence of ferrihydrite based on the geochemical modeling. 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 A1 LF demonstrate sequestration of COIs is occurring.

Based on these findings, arsenic, barium, 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 A1 LF 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 A1 LF for arsenic, barium, cobalt, and lithium with respect to the A1 LF 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 A1 LF 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. 19122434

Background Wells	Monitoring Wells	Nature and Extent Wells	Porewater Sample
BMW-11AR, BMW-27, BMW-33, AI-17-SPOIL, AIV-18-OB-95	BMW-18, BMW-19, BMW-20, BMW-21, BMW-22, BMW-23, BMW-24, BMW-26, BMW-28,	BMW-25, BMW-29, BMW-30, BMW-31, BMW-32, AI-2-OB	S-1

Table 2: Summary of overburden samples collected 19122434

Sample Location	Core Description
Assessment boring BMW-29 (30'-31')	Mine spoil, clayey sand (SC), fine to very fine sand, gray to brown, wet, unconsolidated
Assessment boring BMW-30 (40'-41')	Mine spoil, clayey sand (SC), very fine sand, light gray to gray with some black, wet, unconsolidated
Assessment boring BMW-31 (14'-15')	Mine spoil, sandy clay (SC), light gray to orange, wet, unconsolidated
Assessment boring BMW-32 (25'-26')	Mine spoil, clayey sand (SC), fine to very fine sand, gray with some orange, wet, unconsolidated
Background boring BMW-33 (38'-39')	Mine spoil, clayey sand (SC); mottled gray, light gray, and tan; lignite fragments, wet, unconsolidated

Table 3: Groundwater Geochemical Modeling Results

19122434

Parameter	Units	BMW-11AR	BMW-18	BMW-19	BMW-20	BMW-21	BMW-22	BMW-23	BMW-24	BMW-25	BMW-26	BMW-27	BMW-28
MINERAL PHASES - Saturation Indices													
Otavite	$CdCO_3$	-2.49	-2.79	-2.77	-2.71	-2.51	-2.97	-2.78	-3.07		-2.41	-2.60	-2.75
Ferrihydrite	$Fe(OH)_3$	**3.45**	**2.01**	**3.22**	**3.29**	**3.38**	**4.16**	**4.31**	**4.79**	**3.09**	2.1	1.9	**2.04**
Siderite	$FeCO_3$	-1.79	-2.06	-2.08	-1.89	-1.68	-2.18	-1.72	-2.29	-1.48	-1.7	-1.9	-2.04
Melanterite	$FeSO_4$ $7H_2O$	-7.06	-7.30	-6.73	-7.10	-7.10	-6.85	-6.63	-7.02	-6.97	-7.0	-6.9	-6.75
Anglesite	$PbSO_4$	-5.15	-5.23	-4.60	-5.17	-5.27	-4.71	-4.84	-4.77		-5.1	-5.0	-4.69
Gypsum	$CaSO_4$:$2H_2O$	-1.06	-2.55	**-0.23**	-1.04	-1.04	-0.65	-1.06	-1.40	-0.88	-0.8	-0.8	**-0.43**
Jarosite-H	$(H_3O)Fe_3(SO_4)_2(OH)_6$	-1.03	-5.36	-0.74	-0.85	-1.41	**2.48**	**2.03**	**3.18**	-2.82	-4.77	-4.70	-3.76
Jarosite-K	$KFe_3(SO_4)_2(OH)_6$	**5.28**	**-0.08**	**5.33**	**4.72**	**4.38**	**8.08**	**7.64**	**8.68**	**3.35**	**1.32**	**1.24**	**2.38**
Jarosite-Na	$NaFe_3(SO_4)_2(OH)_6$	**2.53**	-1.70	**3.00**	**3.19**	**2.86**	**6.32**	**6.11**	**6.85**	**1.46**	-0.76	-0.85	**0.54**
Calcite	$CaCO_3$	**0.08**	-1.45	**0.29**	**0.04**	**0.25**	**-0.11**	**-0.28**	-0.79	**0.49**	**0.38**	**0.16**	**0.15**
Magnesite	$MgCO_3$	-0.99	-2.72	-0.69	-0.73	-0.51	-0.96	-1.01	-1.53	**-0.43**	-0.56	-0.77	-0.76
Barite	$BaSO_4$	**0.35**	**0.01**	**0.25**	**0.37**	**0.37**	**0.84**	**0.54**	**1.13**		**0.31**	**0.29**	**0.69**
Witherite	$BaCO_3$	-3.80	-4.18	-4.52	-3.85	-3.64	-3.91	-3.97	-3.55		-3.83	-4.06	-4.03
Fluorite	CaF_2	-2.52	-3.37	-2.49	-2.05	-2.16	-2.12	-3.42	-2.75	-2.87	-3.17	-3.17	-1.83
CoCO3	$CoCO_3$	-3.39	-3.64	-3.62	-3.51	-3.30	-3.74	-3.55	-3.49	-2.88	-3.29	-3.49	-3.60
Cerrusite	$PbCO_3$	-2.51	-2.63	-2.58	-2.60	-2.48	-2.68	-2.57	-2.65		-2.51	-2.59	-2.62
Carbon Dioxide	pCO2(g) [(b)]	-1.09	-1.13	-1.21	-0.82	-1.02	-1.00	-1.20	-1.50	-1.20	-0.97	-0.82	-0.90

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. Sequential Extraction and Total Metals From Overburden 19122434

Sample Location		BMW-29	BMW-30	BMW-31	BMW-32	BMW-33
Sample Depth (feet bgs)		30'-31'	40'-41'	14'-15'	25'-26'	38'-39'
Sample Date		5/31/2019	5/31/2019	5/31/2019	5/31/2019	5/31/2019
Analyte	**SEP Step**					
Aluminum	SEP Step 1	54 U	48 U	47 U	47 U	52 U
Aluminum	SEP Step 2	16 J *	7.3 J *	36 * U	17 J *	10 J *
Aluminum	SEP Step 3	170	35	59	81	94
Aluminum	SEP Step 4	2600	1100	1600	1200	1800
Aluminum	SEP Step 5	500 *	66 J *	67 J *	58 J *	64 J *
Aluminum	SEP Step 6	3500	1300	1800	1100	3400
Aluminum	SEP Step 7	34000	37000	26000	32000	48000
Aluminum	SEP Sum	72000	48000	30000	45000	73000
Aluminum	SEP Total	41000	39000	30000	35000	54000
Antimony	SEP Step 1	16 U	14 U	14 U	14 U	15 U
Antimony	SEP Step 2	12 U	11 U	11 U	11 U	12 U
Antimony	SEP Step 3	4.1 U	3.6 U	3.6 U	3.6 U	3.9 U
Antimony	SEP Step 4	4.1 U	3.6 U	3.6 U	3.6 U	3.9 U
Antimony	SEP Step 5	61 U	53 U	53 U	53 U	58 U
Antimony	SEP Step 6	4.1 U	3.6 U	3.6 U	3.6 U	3.9 U
Antimony	SEP Step 7	4.1 U	3.6 U	3.6 U	3.6 U	3.9 U
Antimony	SEP Sum	4.1 U	3.6 U	3.6 U	3.6 U	3.9 U
Antimony	SEP Total	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Arsenic	SEP Step 1	2.7 U	2.4 U	2.4 U	2.4 U	2.6 U
Arsenic	SEP Step 2	2.0 U	1.8 U	1.8 U	1.8 U	1.9 U
Arsenic	SEP Step 3	1.4	1.3	0.29 J	0.60	0.47 J
Arsenic	SEP Step 4	0.87 B	0.78 B	1.8 B	0.78 B	1.2 B
Arsenic	SEP Step 5	10 U	8.9 U	8.9 U	8.9 U	9.7 U
Arsenic	SEP Step 6	1.1	0.75	0.54 J	0.42 J	0.85
Arsenic	SEP Step 7	0.59 J	1.3	0.58 J	1.2	0.64 J
Arsenic	SEP Sum	3.8	4.8	3.0	3.2	3.2
Arsenic	SEP Total	4.0	4.1	3.2	3.0	3.2
Barium	SEP Step 1	14 U	12 U	0.58 J	12 U	1.5 J
Barium	SEP Step 2	1.1 J *	0.52 J *	0.46 J *	8.9 * U	0.90 J *
Barium	SEP Step 3	4.3 B	2.0 J B	14 B	1.3 J B	7.5 B
Barium	SEP Step 4	19	7.4	33	17	20
Barium	SEP Step 5	17 J *	45 * U	3.9 J *	3.3 J *	4.1 J *
Barium	SEP Step 6	30	4.0	4.4	6.4	13
Barium	SEP Step 7	340	380	320	430	550
Barium	SEP Sum	630	490	430	570	830
Barium	SEP Total	410	390	370	460	590
Beryllium	SEP Step 1	1.4 U	1.2 U	1.2 U	1.2 U	1.3 U
Beryllium	SEP Step 2	1.0 * U	0.89 * U	0.89 * U	0.89 * U	0.97 * U
Beryllium	SEP Step 3	0.11 J	0.30 U	0.069 J	0.30 U	0.028 J
Beryllium	SEP Step 4	0.23 J	0.062 J	0.24 J	0.025 J	0.20 J
Beryllium	SEP Step 5	5.1 * U	4.5 * U	4.5 * U	4.5 * U	4.8 * U
Beryllium	SEP Step 6	0.11 J	0.043 J	0.059 J	0.033 J	0.11 J
Beryllium	SEP Step 7	0.69	0.36	0.30	0.50	0.69
Beryllium	SEP Sum	1.2	0.46	0.66	0.53	1.0
Beryllium	SEP Total	1.1	0.46	0.67	0.56	1.0
Boron	Total 3050B	15 J	23 U	24 U	22 U	24 U
Chromium	Total 3050B	19	7.9	7.3	7.6	14

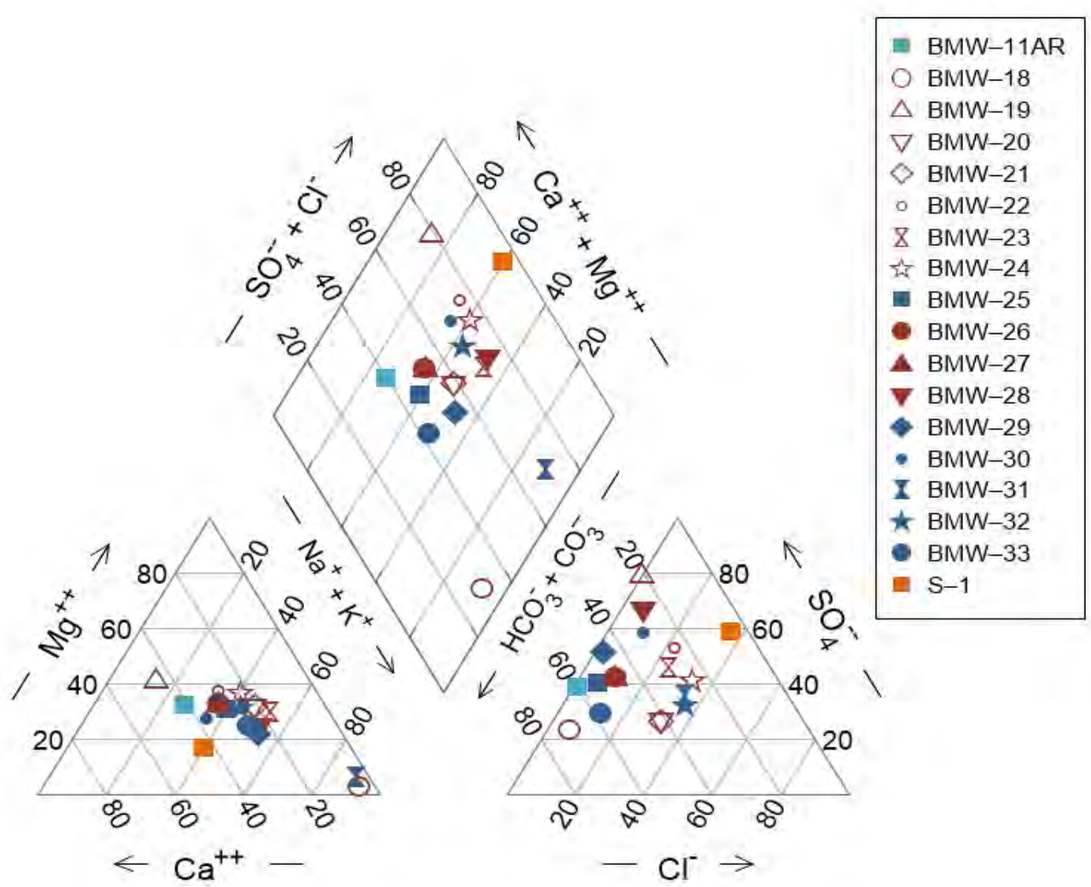
Table 4. Sequential Extraction and Total Metals From Overburden 19122434

Sample Location		BMW-29	BMW-30	BMW-31	BMW-32	BMW-33
Sample Depth (feet bgs)		30'-31'	40'-41'	14'-15'	25'-26'	38'-39'
Sample Date		5/31/2019	5/31/2019	5/31/2019	5/31/2019	5/31/2019
Analyte	**SEP Step**					
Cobalt	SEP Step 1	14 U	0.82 J	12 U	12 U	0.29 J
Cobalt	SEP Step 2	1.4 J	0.28 J	8.9 U	8.9 U	0.74 J
Cobalt	SEP Step 3	1.5 J	0.28 J	16	0.060 J	1.9 J
Cobalt	SEP Step 4	3.2 J	0.50 J	2.8 J	0.60 J	1.5 J
Cobalt	SEP Step 5	1.0 J *	45 * U	45 * U	45 * U	48 * U
Cobalt	SEP Step 6	1.2 J	0.46 J	0.46 J	0.28 J	1.1 J
Cobalt	SEP Step 7	0.90 J	0.76 J	0.82 J	0.76 J	0.57 J
Cobalt	SEP Sum	10 J	3.4 J	18	1.6 J	4.6 J
Cobalt	SEP Total	9.2	3.1	20	1.7 J	6.1
Hg	Total Hg	0.078 J	0.054 J	0.12 U	0.053 J	0.13 U
Iron	SEP Step 1	27 U	24 U	24 U	24 U	26 U
Iron	SEP Step 2	48 *	24 *	18 * U	36 *	14 J *
Iron	SEP Step 3	4200	190	120	500	510
Iron	SEP Step 4	8300	1000	5600	2000	4900
Iron	SEP Step 5	530 *	89 * U	89 * U	89 * U	97 * U
Iron	SEP Step 6	4800	1800	1700	890	3900
Iron	SEP Step 7	6700	2800	3600	2800	6100
Iron	SEP Sum	26000	5800	10000	5600	13000
Iron	SEP Total	25000	5800	11000	6200	15000
Lead	Total 3050B	9.7	5.9	6.8	3.9	5.9
Lithium	SEP Step 1	14 U	12 U	12 U	12 U	13 U
Lithium	SEP Step 2	10 U	8.9 U	8.9 U	8.9 U	9.7 U
Lithium	SEP Step 3	3.4 U	3.0 U	3.0 U	3.0 U	3.2 U
Lithium	SEP Step 4	6.7	1.7 J	2.2 J	2.5 J	2.1 J
Lithium	SEP Step 5	51 U	45 U	45 U	45 U	48 U
Lithium	SEP Step 6	4.0	0.91 J	1.3 J	1.0 J	2.1 J
Lithium	SEP Step 7	14	14	15	8.2	9.1
Lithium	SEP Sum	31	18	18	11	14
Lithium	SEP Total	25	17	19	12	13
Manganese	SEP Step 1	3.8 J	1.5 J	11	1.0 J	17
Manganese	SEP Step 2	35	2.7 U	2.4 J	2.7 U	25
Manganese	SEP Step 3	95 B	0.29 J B	260 B	0.60 J B	85 B
Manganese	SEP Step 4	180	8.7	63	13	55
Manganese	SEP Step 5	33 *	13 * U	13 * U	13 * U	15 * U
Manganese	SEP Step 6	38	8.0	10	10	22
Manganese	SEP Step 7	36	38	24	42	30
Manganese	SEP Sum	490	60	280	70	130
Manganese	SEP Total	420	57	370	67	230
Molybdenum	SEP Step 1	11 U	9.5 U	9.5 U	9.5 U	10 U
Molybdenum	SEP Step 2	8.2 U	7.1 U	7.1 U	7.1 U	7.7 U
Molybdenum	SEP Step 3	0.14 J	2.4 U	2.4 U	2.4 U	2.6 U
Molybdenum	SEP Step 4	2.7 U	2.4 U	2.4 U	2.4 U	2.6 U
Molybdenum	SEP Step 5	41 U	36 U	36 U	36 U	39 U
Molybdenum	SEP Step 6	2.7 U	2.4 U	2.4 U	2.4 U	2.6 U
Molybdenum	SEP Step 7	0.20 J	2.4 U	0.16 J	2.4 U	2.6 U

Table 4. Sequential Extraction and Total Metals From Overburden 19122434

Sample Location		BMW-29	BMW-30	BMW-31	BMW-32	BMW-33
Sample Depth (feet bgs)		30'-31'	40'-41'	14'-15'	25'-26'	38'-39'
Sample Date		5/31/2019	5/31/2019	5/31/2019	5/31/2019	5/31/2019
Analyte	**SEP Step**					
Molybdenum	SEP Sum	0.33 J	2.0 U	0.16 J	2.0 U	2.0 U
Molybdenum	SEP Total	0.70 J	0.17 J	0.29 J	0.33 J	0.22 J
Selenium	SEP Step 1	2.7 U	2.4 U	2.4 U	2.4 U	2.6 U
Selenium	SEP Step 2	1.2 J B	0.67 J B	0.77 J B	0.78 J B	1.9 U
Selenium	SEP Step 3	0.28 J B	0.38 J B	0.23 J B	0.21 J B	0.25 J B
Selenium	SEP Step 4	0.68 * U	0.76 B *	1.1 B *	0.62 B *	0.71 B *
Selenium	SEP Step 5	10 U	8.9 U	8.9 U	8.9 U	9.7 U
Selenium	SEP Step 6	0.68 U	0.59 U	0.59 U	0.59 U	0.65 U
Selenium	SEP Step 7	0.68 U	1.2 U	1.2 U	0.59 U	0.65 U
Selenium	SEP Sum	0.68 U	1.1	0.59 U	0.54 J	0.65 U
Selenium	SEP Total	1.5	1.8	2.1	1.6	0.95
Thallium	SEP Step 1	9.5 U	8.3 U	8.3 U	8.3 U	9.0 U
Thallium	SEP Step 2	7.1 U	6.2 U	6.2 U	6.2 U	6.8 U
Thallium	SEP Step 3	2.4 U	2.1 U	2.1 U	2.1 U	2.3 U
Thallium	SEP Step 4	2.4 U	2.1 U	2.1 U	2.1 U	2.3 U
Thallium	SEP Step 5	36 * U	31 * U	31 * U	31 * U	34 * U
Thallium	SEP Step 6	2.4 U	2.1 U	2.1 U	2.1 U	2.3 U
Thallium	SEP Step 7	0.74 J	0.87 J	0.52 J	4.2 U	4.5 U
Thallium	SEP Sum	1.4 J	10 U	0.67 J	0.44 J	11 U
Thallium	SEP Total	0.74 J	0.87 J	0.52 J	1.8 U	1.8 U

Figures



% meq/kg

CLIENT
LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

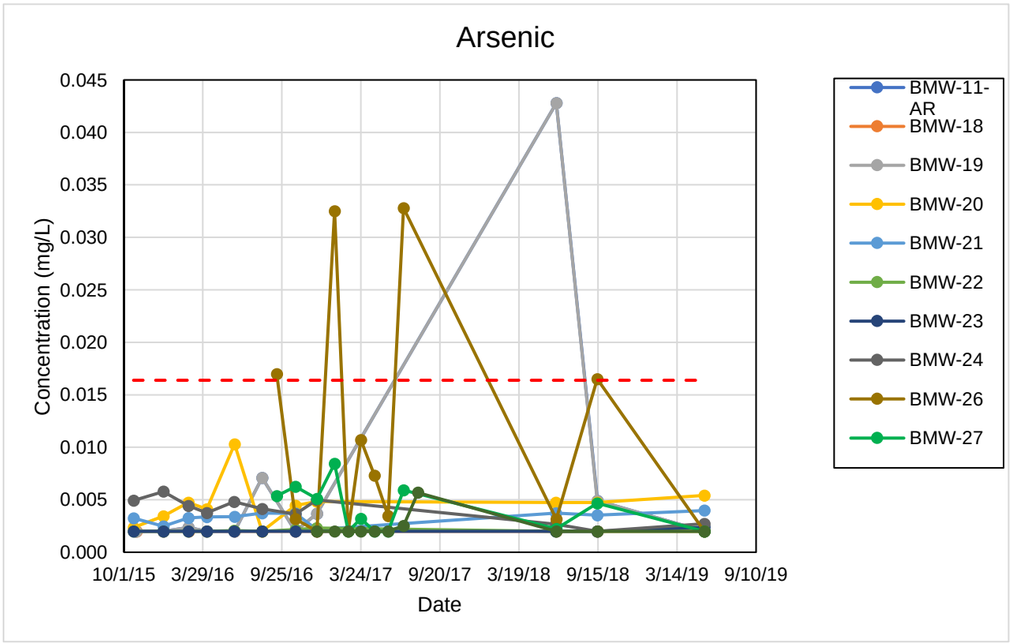
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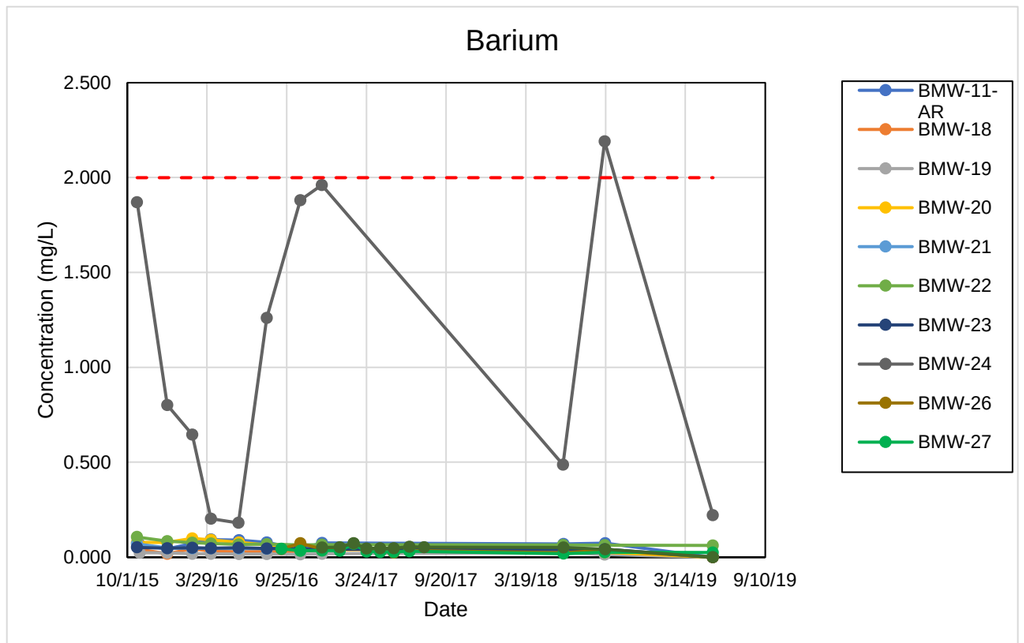
TITLE
MAJOR GROUNDWATER CEHMISTRY

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

(a)



(b)



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A1 LANDFILL AREA

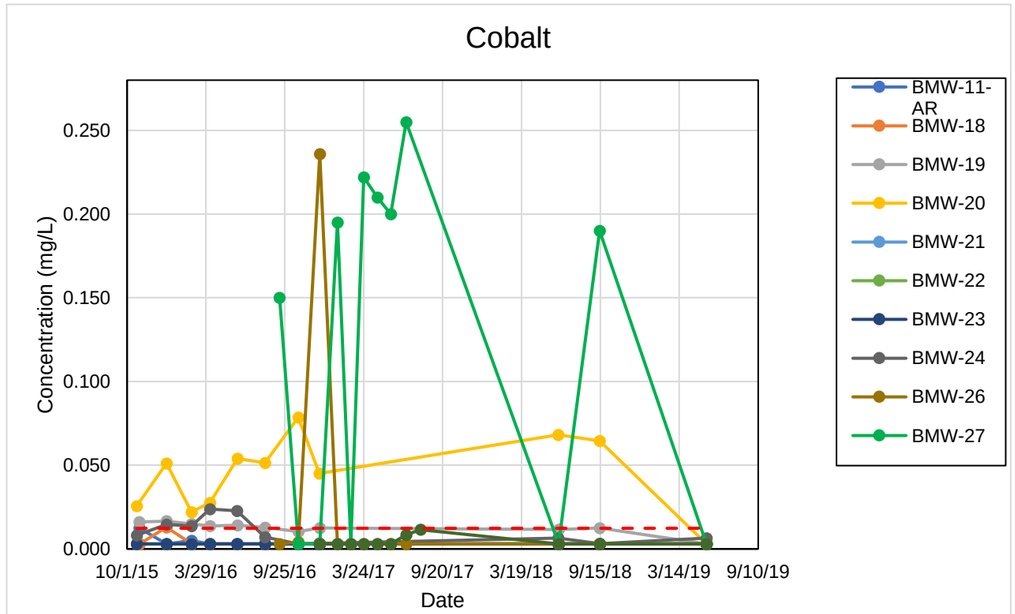
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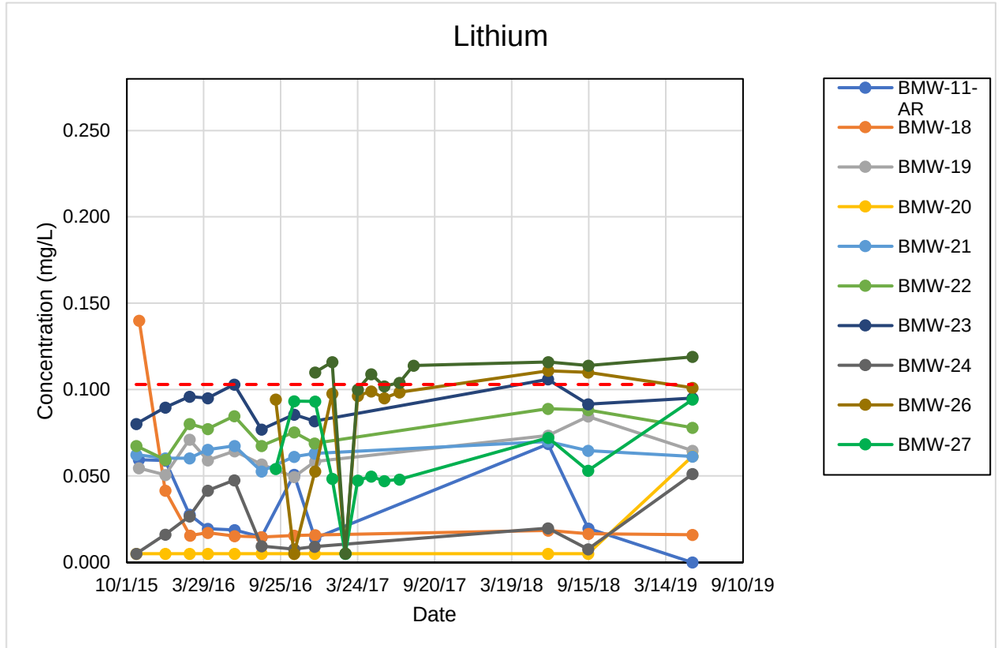
TITLE
HISTORICAL TRENDS IN ARSENIC (A), and BARIUM (B)

PROJECT NO.	PHASE	REV.	FIGURE
19122434	D	A	2a-b

(c)



(d)



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LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

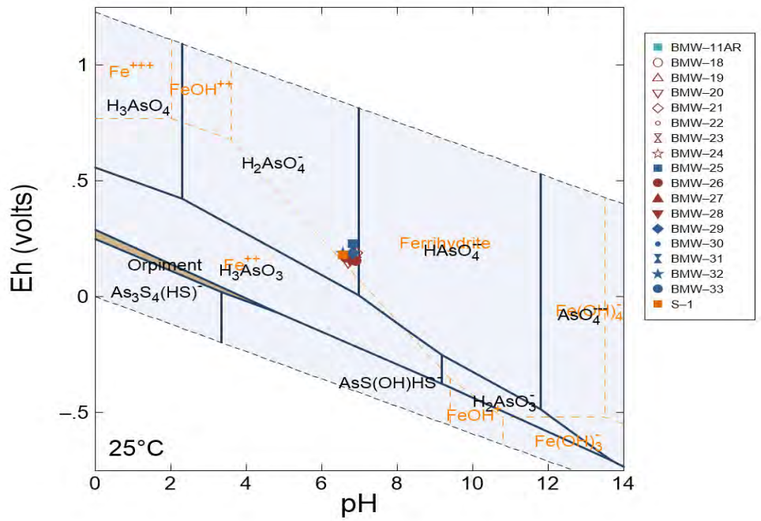
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ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

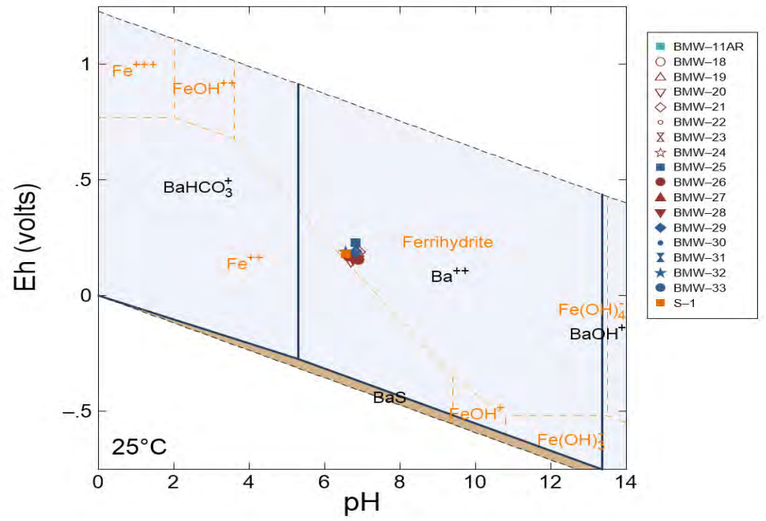
TITLE
HISTORICAL TRENDS IN COBALT (C), AND LITHIUM (D)

PROJECT NO.	PHASE	REV.	FIGURE
19122434	D	A	2c-d

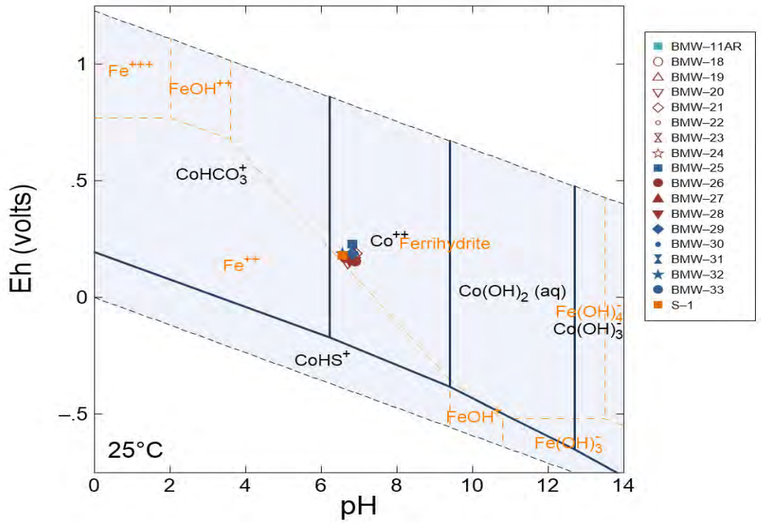
(a)



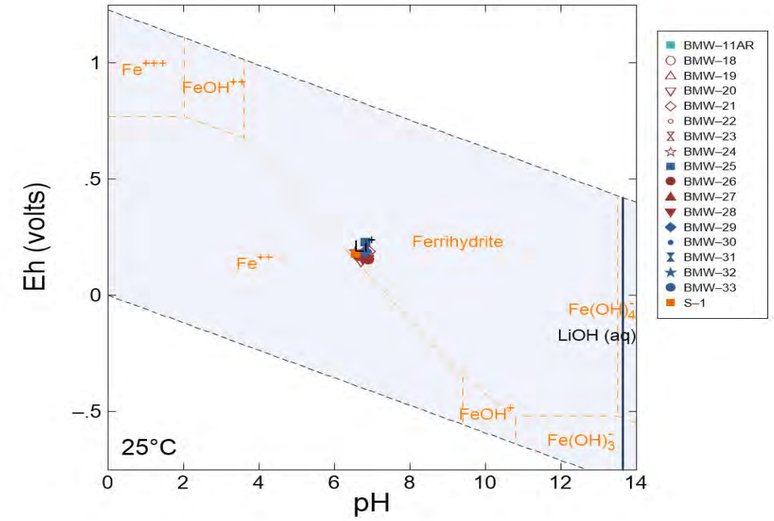
(b)



(c)



(d)



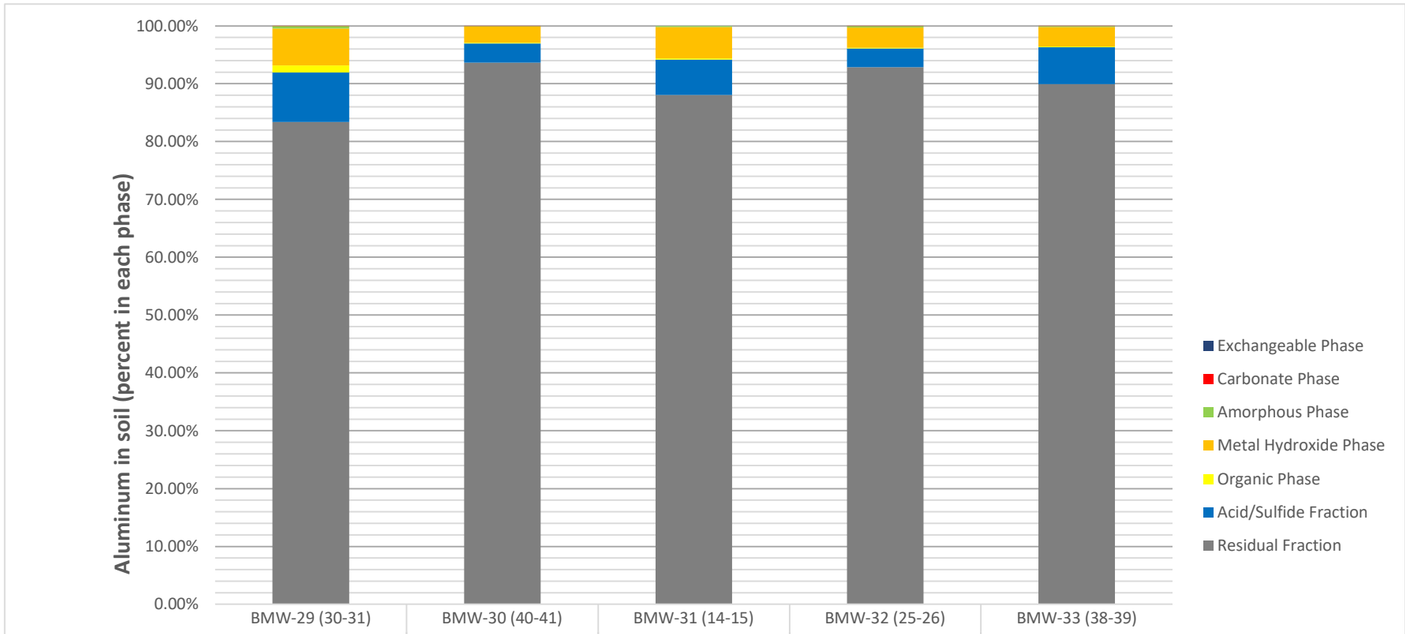
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MARTIN LAKE SES
A1 LANDFILL AREA

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ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
SPECIATION OF ARSENIC (A), BARIUM (B), COBALT (C), AND LITHIUM (D), IN GROUNDWATER

PROJECT NO.	PHASE	REV.	FIGURE
19122434	D	A	3a-d



	BMW-29 (30-31)	BMW-30 (40-41)	BMW-31 (14-15)	BMW-32 (25-26)	BMW-33 (38-39)
Exchangeable Phase	0.00%	0.00%	0.00%	0.00%	0.00%
Carbonate Phase	0.04%	0.02%	0.00%	0.05%	0.02%
Amorphous Phase	0.42%	0.09%	0.20%	0.24%	0.18%
Metal Hydroxide Phase	6.37%	2.78%	5.42%	3.48%	3.37%
Organic Phase	1.23%	0.17%	0.23%	0.17%	0.12%
Acid/Sulfide Fraction	8.58%	3.29%	6.10%	3.19%	6.37%
Residual Fraction	83.36%	93.65%	88.06%	92.87%	89.94%

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

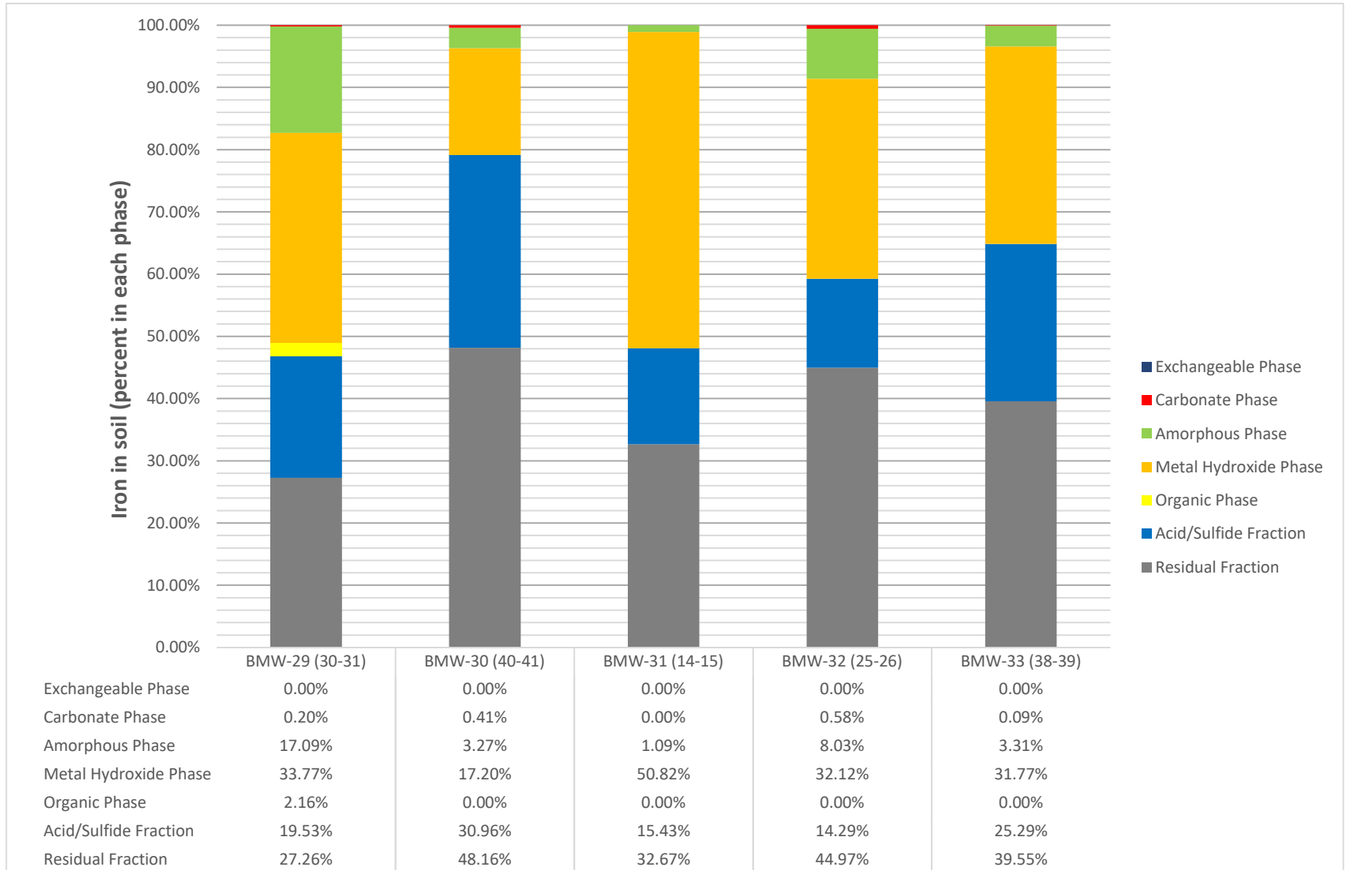
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MARTIN LAKE SES
A1 LANDFILL AREA

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PROJECT
ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
SEQUENTIAL EXTRACTION OF ALUMINUM

PROJECT NO.	PHASE	REV.	FIGURE
19122434	D	A	4



	BMW-29 (30-31)	BMW-30 (40-41)	BMW-31 (14-15)	BMW-32 (25-26)	BMW-33 (38-39)
Exchangeable Phase	0.00%	0.00%	0.00%	0.00%	0.00%
Carbonate Phase	0.20%	0.41%	0.00%	0.58%	0.09%
Amorphous Phase	17.09%	3.27%	1.09%	8.03%	3.31%
Metal Hydroxide Phase	33.77%	17.20%	50.82%	32.12%	31.77%
Organic Phase	2.16%	0.00%	0.00%	0.00%	0.00%
Acid/Sulfide Fraction	19.53%	30.96%	15.43%	14.29%	25.29%
Residual Fraction	27.26%	48.16%	32.67%	44.97%	39.55%

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

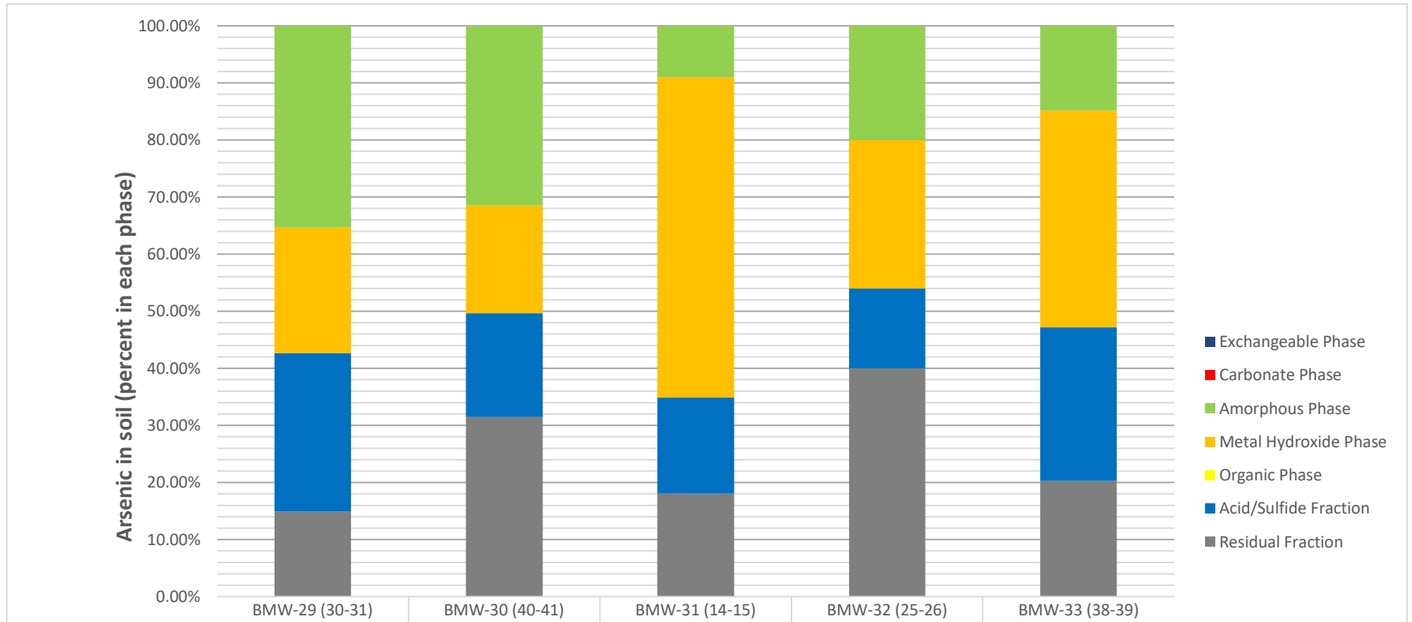
CLIENT
LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

CONSULTANT
GOLDER

PROJECT
ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
SEQUENTIAL EXTRACTION OF IRON

PROJECT NO.	PHASE	REV.	FIGURE
19122434	D	A	5



	BMW-29 (30-31)	BMW-30 (40-41)	BMW-31 (14-15)	BMW-32 (25-26)	BMW-33 (38-39)
Exchangeable Phase	0.00%	0.00%	0.00%	0.00%	0.00%
Carbonate Phase	0.00%	0.00%	0.00%	0.00%	0.00%
Amorphous Phase	35.35%	31.48%	9.03%	20.00%	14.87%
Metal Hydroxide Phase	21.97%	18.89%	56.07%	26.00%	37.97%
Organic Phase	0.00%	0.00%	0.00%	0.00%	0.00%
Acid/Sulfide Fraction	27.78%	18.16%	16.82%	14.00%	26.90%
Residual Fraction	14.90%	31.48%	18.07%	40.00%	20.25%

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

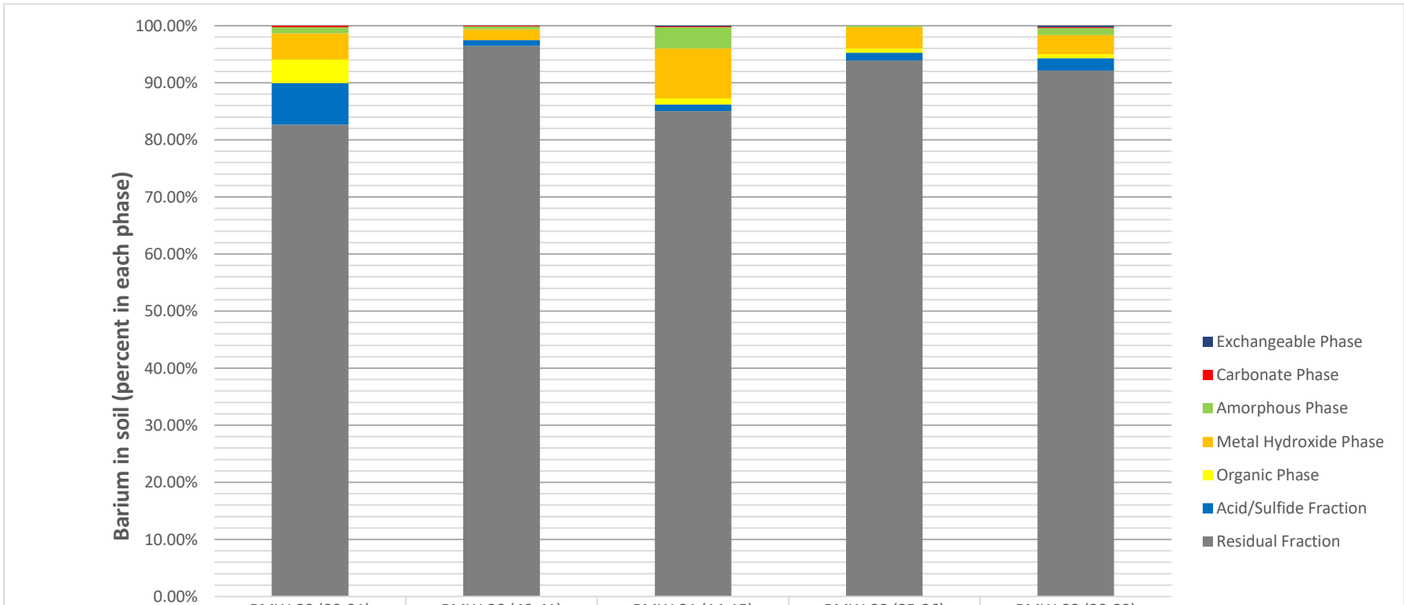
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LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

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ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
SEQUENTIAL EXTRACTION OF ARSENIC

PROJECT NO.	PHASE	REV.	FIGURE
19122434	D	A	6



	BMW-29 (30-31)	BMW-30 (40-41)	BMW-31 (14-15)	BMW-32 (25-26)	BMW-33 (38-39)
Exchangeable Phase	0.00%	0.00%	0.15%	0.00%	0.25%
Carbonate Phase	0.27%	0.13%	0.12%	0.00%	0.15%
Amorphous Phase	1.05%	0.51%	3.72%	0.28%	1.26%
Metal Hydroxide Phase	4.62%	1.88%	8.77%	3.71%	3.35%
Organic Phase	4.13%	0.00%	1.04%	0.72%	0.69%
Acid/Sulfide Fraction	7.29%	1.02%	1.17%	1.40%	2.18%
Residual Fraction	82.64%	96.47%	85.03%	93.89%	92.13%

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

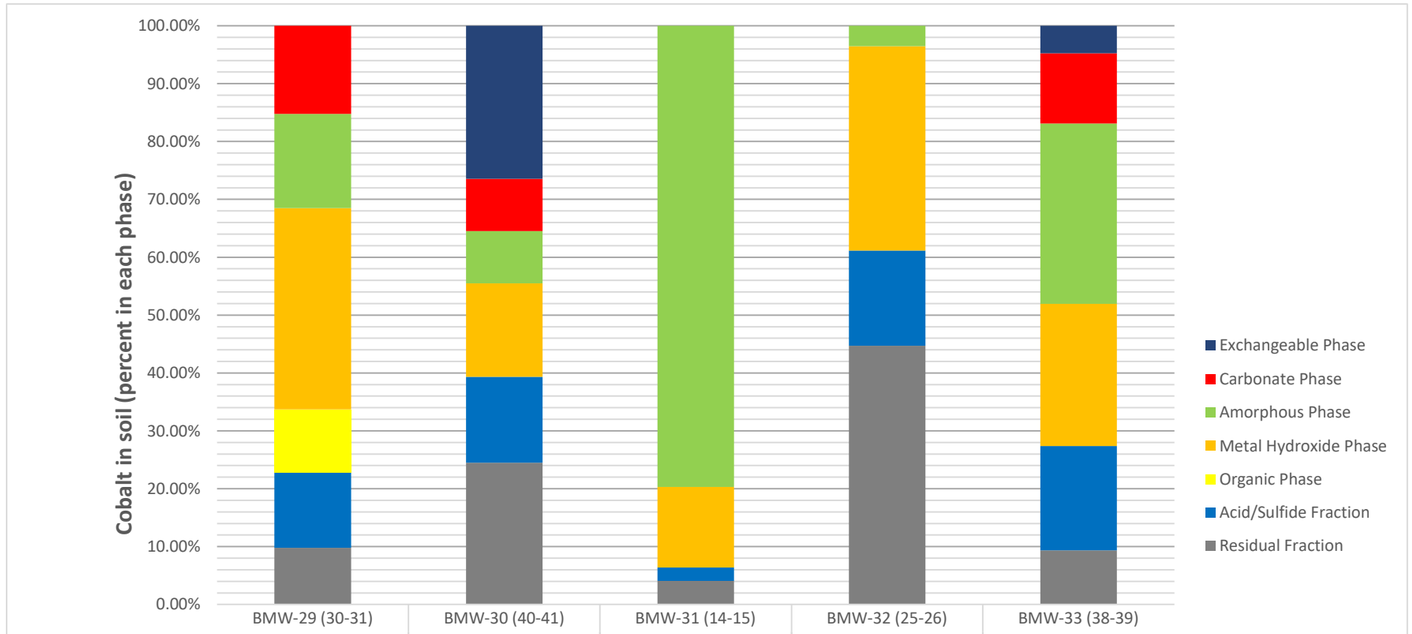
CLIENT
LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

CONSULTANT
GOLDER

PROJECT
ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
SEQUENTIAL EXTRACTION OF BARIUM

PROJECT NO.	PHASE	REV.	FIGURE
19122434	D	A	7



	BMW-29 (30-31)	BMW-30 (40-41)	BMW-31 (14-15)	BMW-32 (25-26)	BMW-33 (38-39)
Exchangeable Phase	0.00%	26.45%	0.00%	0.00%	4.75%
Carbonate Phase	15.22%	9.03%	0.00%	0.00%	12.13%
Amorphous Phase	16.30%	9.03%	79.68%	3.53%	31.15%
Metal Hydroxide Phase	34.78%	16.13%	13.94%	35.29%	24.59%
Organic Phase	10.87%	0.00%	0.00%	0.00%	0.00%
Acid/Sulfide Fraction	13.04%	14.84%	2.29%	16.47%	18.03%
Residual Fraction	9.78%	24.52%	4.08%	44.71%	9.34%

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

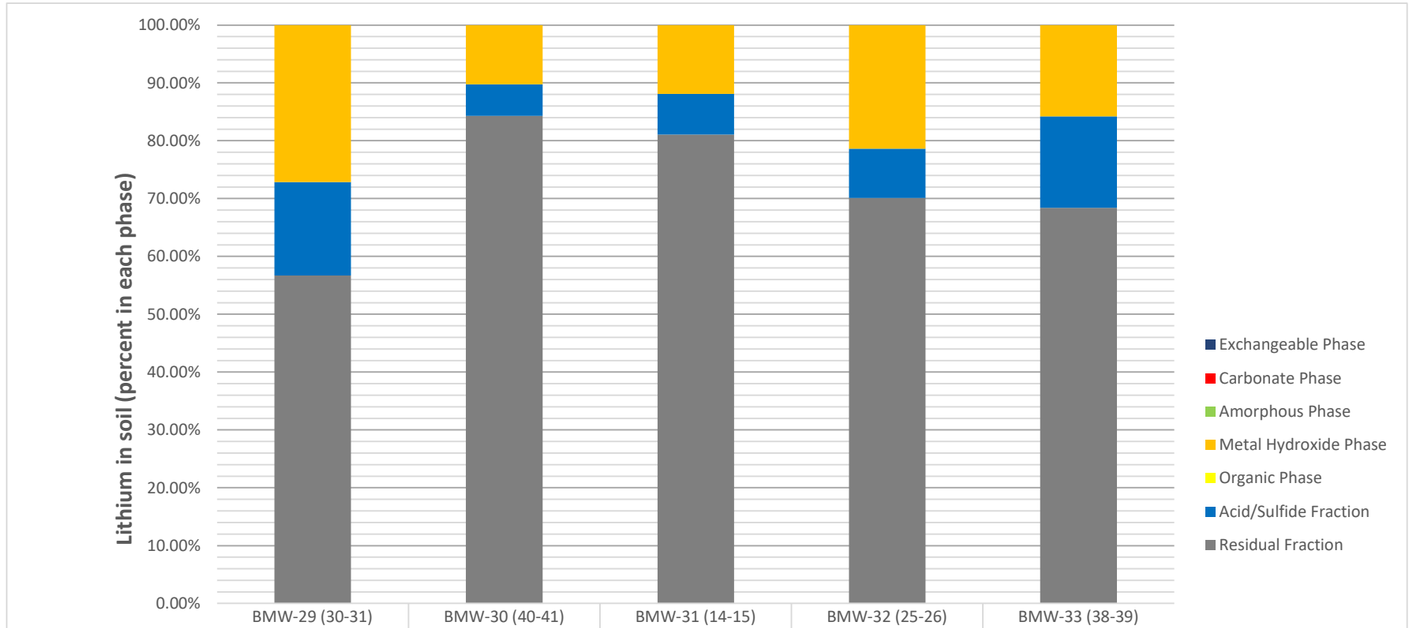
CLIENT
LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

CONSULTANT
GOLDER

PROJECT
ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
SEQUENTIAL EXTRACTION OF COBALT

PROJECT NO.	PHASE	REV.	FIGURE
19122434	D	A	8



	BMW-29 (30-31)	BMW-30 (40-41)	BMW-31 (14-15)	BMW-32 (25-26)	BMW-33 (38-39)
Exchangeable Phase	0.00%	0.00%	0.00%	0.00%	0.00%
Carbonate Phase	0.00%	0.00%	0.00%	0.00%	0.00%
Amorphous Phase	0.00%	0.00%	0.00%	0.00%	0.00%
Metal Hydroxide Phase	27.13%	10.23%	11.89%	21.37%	15.79%
Organic Phase	0.00%	0.00%	0.00%	0.00%	0.00%
Acid/Sulfide Fraction	16.19%	5.48%	7.03%	8.55%	15.79%
Residual Fraction	56.68%	84.29%	81.08%	70.09%	68.42%

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

CLIENT
LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

CONSULTANT
GOLDER

PROJECT
ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
SEQUENTIAL EXTRACTION OF LITHIUM

PROJECT NO.	PHASE	REV.	FIGURE
19122434	D	A	9

APPENDIX A

BORING LOGS

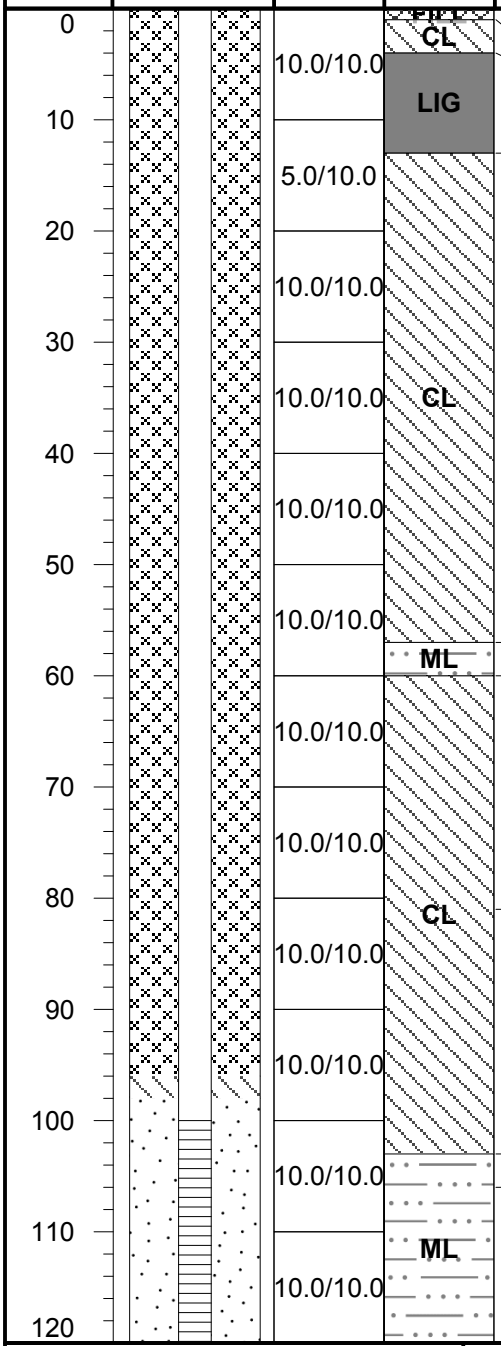
Luminant

Log of Boring: BMW-18

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/29/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	120
Driller's License:	5814M	TOC Elevation (ft. AMSL):	357.833
Logged By:	Jeremiah Bihl	Northing:	1051216950.561
Sampling Method:	4"x10' Core barrel	Easting:	2915599.992



USCS	Lithologic Description
CL	(0 - 1) Top soil, light brown, rocks (1-3 cm) present (1 - 4) CLAY spoil, dark gray to black with pale tan mottling, dry, firm, brittle
LIG	(4 - 13) LIGNITE with clay spoil, dark grey to black, dry to moist, soft, brittle, angular, low plasticity
CL	(13 - 57) Silty CLAY spoil, dark gray to dark brown with red and yellow mottling, dry, soft to firm, crumbly, medium plasticity, color change to tan at 30', coal seam at 32' (black, dry to moist, soft), pieces of lignite present, color change to gray to dark gray at 35'
ML	(57 - 60) Clayey SILT spoil, light brown to tan, moist, soft, low plasticity, lignite seam at 59'
CL	(60 - 81) Silty CLAY spoil, black to gray, dry, soft to firm, low plasticity, crumbly, 6" dry white gravel layer at 69', 4" light brown silty sand layer at 81'
CL	(81 - 103) Silty CLAY spoil, light gray, dry to moist, soft, low to medium plasticity, crumbly, rubber tire pieces at 89', hard lignite seam at 90' (hard, dry, black, firm), streaks of black (91'- 94'), becomes hard at 94', light to dark gray (94'-103')
ML	(103 - 106) Clayey SILT spoil, gray, very moist, soft, medium plasticity
ML	(106 - 120) Clayey SILT spoil, gray to dark gray, dry, firm, low plasticity

PBW

Pastor, Behling & Wheeler, LLC
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Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

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

Well Materials
(0-100) Casing, 2" Sch 40 FJT PVC
(100-120) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-96') Grout
(96'-98') Bentonite pellets
(98'-110') 20/40 sand

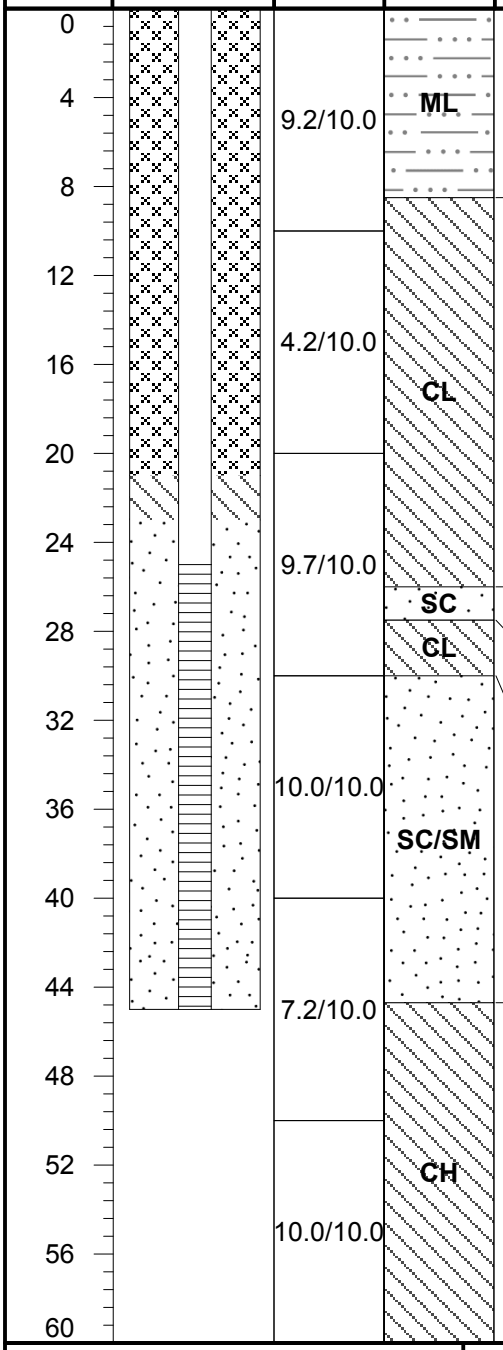
Luminant

Log of Boring: BMW-19

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	10/7/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	60
Driller's License:	5814M	TOC Elevation (ft. AMSL):	400.685
Logged By:	Nolan Townsend	Northing:	1048219535.121
Sampling Method:	4"x10' Core barrel	Easting:	2918071.024



Lithologic Description

(0 - 8.5) Sandy SILT with clay spoil, light brown to brownish yellow, dry to slightly mosit, soft, low plasticity, more clay content below ~1.0', trace black lignite fragments - dry, firm to hard, brittle, friable, sharp basal contact

(8.5 - 26) Sandy CLAY spoil, yellowish brown, gray after 9.5', trace to moderate orange-yellow mottling, dry to moist, firm, low plasticity, trace black lignite fragments, very fine sand, sharp basal contact

(26 - 27.5) Clayey SAND spoil, gray to yellowish brown, very moist to wet, soft, low plasticity, very fine sand, sharp basal conact

(27.5 - 30) Sandy CLAY spoil, gray to yellowish brown, trace to moderate orange mottling, moist to very moist, soft to firm, moderate plasticity, very fine sand, small lignite seam 29.7'-30.0', brittle and friable, dry, black, hard, sharp basal contact

(30 - 44.7) Clayey silty SAND spoil - sandy CLAY spoil, brownish yellow to gray to greenish gray, trace orange mottling, abundant orange mottling 37.5'-38.5' and 42'-44.7', very moist to wet, soft to firm, moderate to high plasicity, very fine sand

(44.7 - 60) Sandy CLAY spoil, greenish gray to gray, trace orange-red mottling, dry to moist, firm, moderate to high plasticity, trace black lignite fragments, abundant orange and red mottling 56.0'-59.5'

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Notes:
1. This log should not be used separately from the report to which it is attached.
2. Hole collapsed - drilled back down to 45' with 6" casing to set well.

Well Materials
(0-25) Casing, 2" Sch 40 FJT PVC
(25-45) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-21') Grout
(21'-23') Bentonite pellets
(23'-45') 20/40 sand

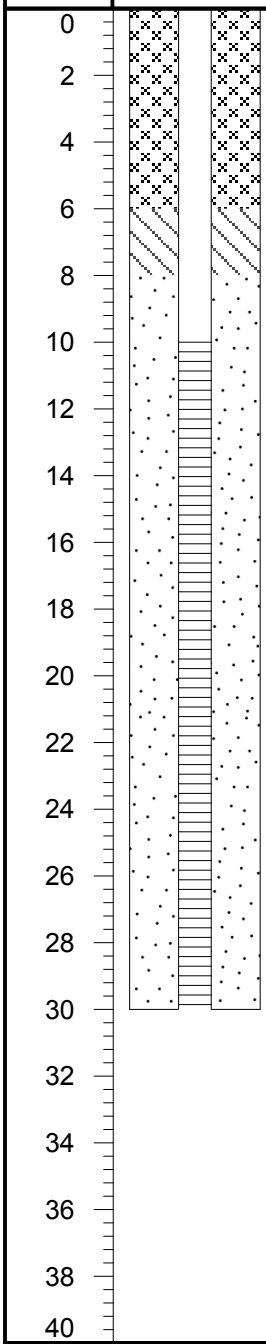
Luminant

Log of Boring: BMW-20

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	10/8/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	40
Driller's License:	5814M	TOC Elevation (ft. AMSL):	357.512
Logged By:	Nolan Townsend	Northing:	1057219166.631
Sampling Method:	4"x10' Core barrel	Easting:	2923995.525



Depth (ft)	Recovery (ft/ft)	USCS	Lithologic Description
0 – 4	9.5/10.0	ML	(0 - 4.5) Sandy SILT with clay spoil, brownish yellow to gray, trace to moderate orange mottling near 4.0', dry, soft, low plasticity, very fine sand
4 – 8		CL	(4.5 - 9) CLAY spoil with trace sand lenses, gray with trace to moderate orange/yellow mottling, dry to slightly moist, firm to hard, low to moderate plasticity, trace calcareous precipitates, sharp basal contact
8 – 12	9.8/10.0	SM	(9 - 12) Slightly silty SAND spoil, yellowish orange to tan, moist to very moist, slightly unconsolidated, moderate to high plasticity, very fine sand, moderately to well sorted, mostly quarts with ~5-10% lithic fragments, clay content present 10'-12', dark gray, sharp basal contact
12 – 14		CL	(12 - 15) CLAY spoil, slightly sandy, gray to dark gray, dry to slihgtly moist, firm to hard, low to moderate plasticity, trace black lignite fragments, sandy lenses, trace orange mottling
14 – 16		SM	(15 - 16.5) Silty SAND with clay spoil, tan to yellowish orange, moist to very moist, moderately consolidated, medium to high plasticity, very fine sand
16 – 18		CL	(16.5 - 18) CLAY spoil as above, dry to moist, firm to hard, moderate plasticity
18 – 28	10.0/10.0	SC	(18 - 28) Clayey SAND spoil, reddish orange and gray, very moist, wet at 20.0', moderately consolidated, moderate to high plasticity, clay composition increases and decreases throughout, very fine sand, becomes gray at 28.0' and more clay content
28 – 32		CH	(28 - 32) Sandy CLAY spoil, gray, trace orange mottling, moist to very moist, firm, moderate to high plasticity, locally sandy lenses/interbeds, trace lignitic fragments (black)
32 – 40	10.0/10.0	SC	(32 - 40) Clayey SAND spoil, reddish orange with gray clay, very moist to wet, moderately consolidated, moderate to high plasticity, very fine sand, localized small sandy clay seams, trace lignite fragments

PBW

Pastor, Behling & Wheeler, LLC
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Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

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

Well Materials
(0-10) Casing, 2" Sch 40 FJT PVC
(10-30) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-6') Grout
(6'-8') Bentonite pellets
(8'-30') 20/40 sand

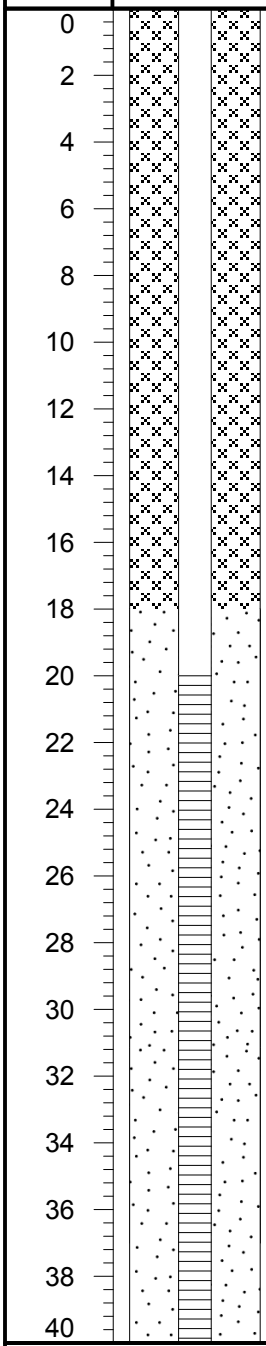
Luminant

Log of Boring: BMW-21

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/27/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	40
Driller's License:	5814M	TOC Elevation (ft. AMSL):	350.976
Logged By:	Jeremiah Bihl	Northing:	1054217792.58
Sampling Method:	4"x10' Core barrel	Easting:	2923478.615



Lithologic Description
(0 - 5) Top soil, sandy with small amounts of clay, tan/brown, moist, soft, low plasticity
(5 - 10) Sandy CLAY spoil, dark gray to black, moist, soft, low to medium plasticity, trace amounts of lignite, clay content increases with depth
(10 - 30) CLAY spoil with angular lignite, light gray, moist, soft, high plasticity, 1'-thick lignite layer at 25', hardness increases from 26' to 30'
(30 - 40) CLAY spoil with angular lignite pieces, wet, soft with increasing hardness with depth, medium plasticity, water present at 30', moisture decreases at 35'

PBW

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Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

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

Well Materials
(0-20) Casing, 2" Sch 40 FJT PVC
(20-40) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-37') Grout
(16'-18') Bentonite pellets
(18'-40') 20/40 sand

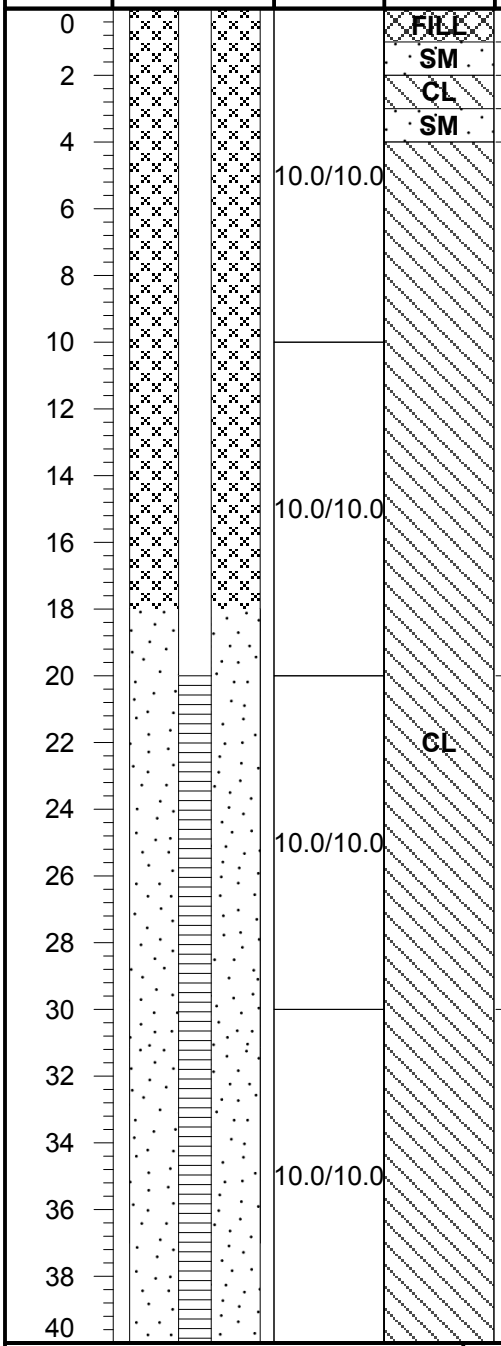
Luminant

Log of Boring: BMW-22

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/27/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	40
Driller's License:	5814M	TOC Elevation (ft. AMSL):	332.304
Logged By:	Jeremiah Bihl	Northing:	1060216298.457
Sampling Method:	4"x10' Core barrel	Easting:	2924359.671



USCS	Lithologic Description
FILL	(0 - 1) Top soil, light brown
SM	(1 - 2) Sandy silty spoil with pieces of rock, light brown, abundant organics
CL	(2 - 3) CLAY spoil, yellow-reddish
SM	(3 - 4) Sandy silty spoil with pieces of rock, light brown/tan, abundant organics
CL	(4 - 20) CLAY spoil, dark gray, lignite present (angular), color change to light gray to yellow clay with some red mottling at 6', firm, moist, medium plasticity, color change to tan at 10', moist and soft lignite layer (12'-13'), hard and lignite layer (angular pieces) at 13'
CL	(20 - 30) Sandy CLAY spoil, light gray, moist, soft, medium plasticity, moisture content decreases with depth, hardness increases with depth, plasticity decreases with depth
CL	(30 - 40) Sandy CLAY spoil, light gray, wet, soft, hardness increases with depth

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Tel (512) 671-3434 Fax (512) 671-3446

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

Well Materials
(0-20) Casing, 2" Sch 40 FJT PVC
(20-40) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-37') Grout
(16'-18') Bentonite pellets
(18'-40') 20/40 sand

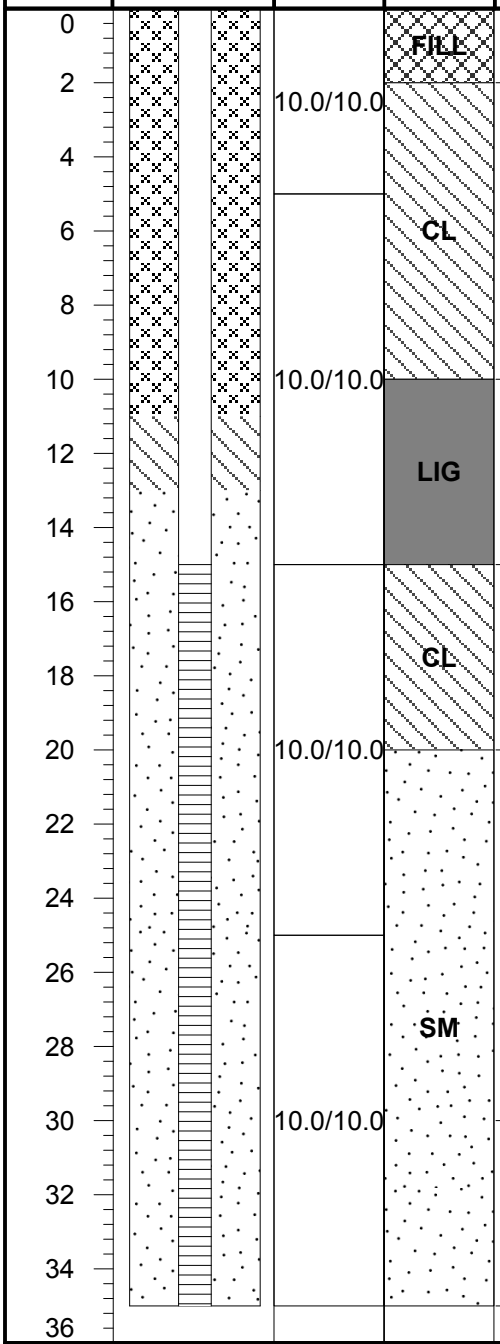
Luminant

Log of Boring: BMW-23

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/28/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	35
Driller's License:	5814M	TOC Elevation (ft. AMSL):	341.903
Logged By:	Jeremiah Bihl	Northing:	1061215105.129
Sampling Method:	4"x10' Core barrel	Easting:	2923179.729



Lithologic Description

(0 - 2) Top soil, sandy silty CLAY, moist, soft, light brown

(2 - 10) CLAY spoil, light gray to pale yellow, some sand present, soft, moist, low plasticity, color change to brown at 5'

(10 - 15) LIGNITE spoil, black, soft, moist, crumbly, sharp contact

(15 - 20) CLAY spoil, dark gray and light tan, dry, hard, medium plasticity

(20 - 30) Silty SAND spoil with small amounts of clay, moist, soft, low plasticity, small seams of lignite, clay content increases with depth (20'-30')

(30 - 35) Silty SAND spoil, light gray, wet, very soft, low plasticity, some clay content at 32', sand lenses present

PBW

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Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

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

Well Materials
(0-15) Casing, 2" Sch 40 FJT PVC
(15-35) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-11') Grout
(11'-13') Bentonite pellets
(13'-35') 20/40 sand

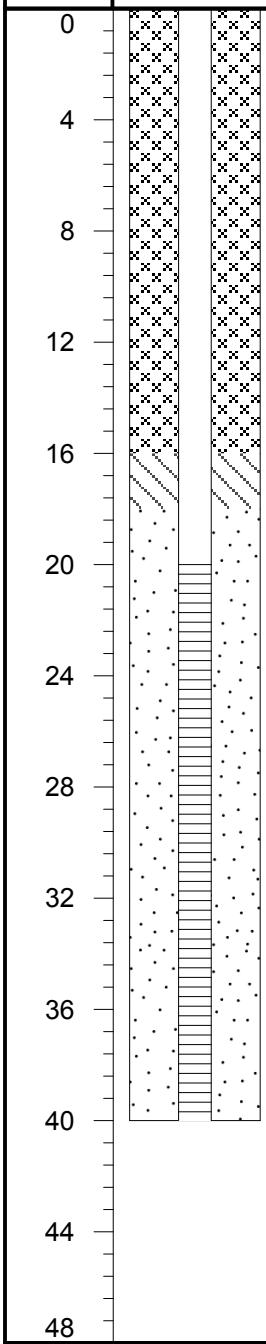
Luminant

Log of Boring: BMW-24

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/28/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	45
Driller's License:	5814M	TOC Elevation (ft. AMSL):	347.074
Logged By:	Jeremiah Bihl	Northing:	1066213874.314
Sampling Method:	4"x10' Core barrel	Easting:	2921447.467



Lithologic Description
(0 - 3) Top soil, brown, moist, roots present
(3 - 4) CLAY spoil, light brown with yellow and orange mottling, dry, soft, low plasticity
(4 - 6) CLAY spoil with some silt, tan to yellow/gray, moist, firm, medium plasticity
(6 - 12) CLAY spoil, black with lignite pieces (0.2-1 cm), dry, soft, low plasticity, sharp contact
(12 - 20) CLAY spoil, dark gray with yellow and red mottling, dry, hard, medium to high plasticity
(20 - 30) Silty CLAY spoil, light gray to gray, yellow and red mottling, moist, very soft, high plasticity, pieces of lignite present, decreasing silt content with depth and becomes harder, more brittle, and dry (28'-30'), increase in red, yellow, and black mottling at 28'
(30 - 35) Silty SAND spoil, gray, wet, soft, low plasticity, subangular to rounded
(35 - 40) Clayey SILT spoil, dry, firm, low plasticity, silt content decreases with depth
(40 - 45) Silty CLAY spoil, light gray, dry, firm, low plasticity

PBW

Pastor, Behling & Wheeler, LLC
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Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

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

Well Materials
(0-20) Casing, 2" Sch 40 FJT PVC
(20-40) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-16') Grout
(16'-18') Bentonite pellets
(18'-40') 20/40 sand

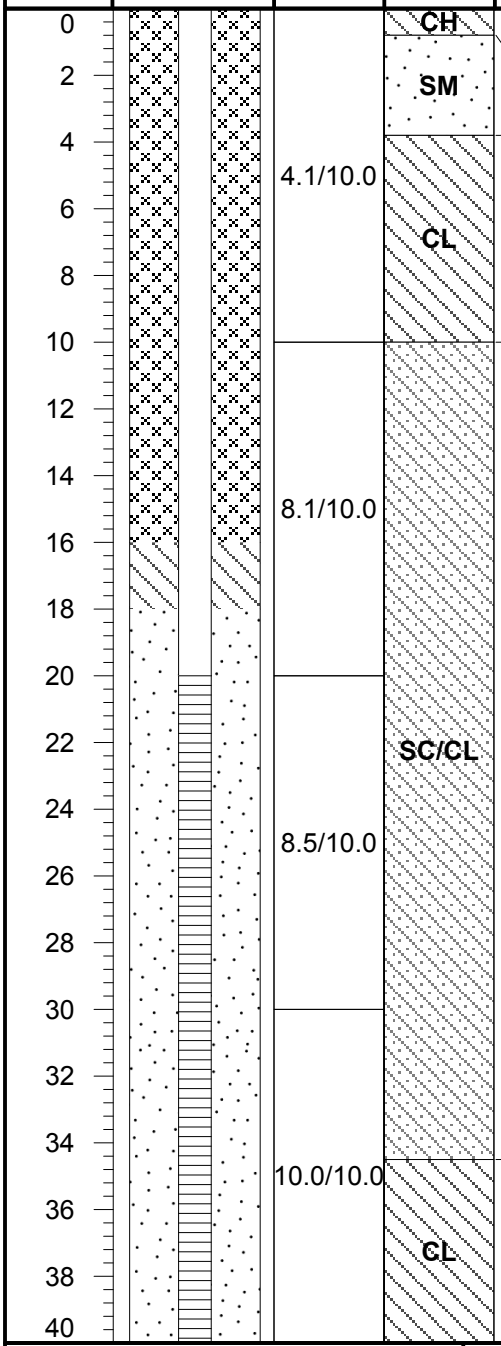
Luminant

Log of Boring: BMW-25

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	10/7/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	40
Driller's License:	5814M	TOC Elevation (ft. AMSL):	339.946
Logged By:	Nolan Townsend	Northing:	1070220215.073
Sampling Method:	4"x10' Core barrel	Easting:	2915715.233



Lithologic Description

(0 - 0.8) Silty CLAY spoil, gray, dry to moist, soft, moderate to high plasticity, trace roots, sharp basal contact

(0.8 - 3.8) Silty, clayey SAND spoil, yellow brown/light brown, dry, soft, low to moderate plasticity, very fine sand, loose/unconsoldated, trace roots, sharp basal contact

(3.8 - 10) Sandy CLAY spoil, gray, dry, frim to hard, low to moderate plasticity, trace sand, trace to moderate red mottling, sharp basal contact

(10 - 34.5) Clayey SAND spoil/sandy CLAY spoil, brownish yellow to light brown to gray, moist to very moist to wet (12'-20', 20'-35'), soft, moderate to high plasticity, trace to moderate orange and rust red mottling, dark gray-gray color 17.5'-20.0', continues as brown-yellow below 20.0', very fine sand, small linterval of clay from 27.4'-28.4' then returns to sandy clay, sharp basal contact

(34.5 - 40) Sandy CLAY spoil, light gray to gray, moist to very moist, firm to hard, low to moderate plasticity, moderate to abundant orange and rust mottling, localized sandy interbeds, very fine sand

PBW

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Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

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

Well Materials
(0-20) Casing, 2" Sch 40 FJT PVC
(20-40) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-16') Grout
(16'-18') Bentonite pellets
(18'-40') 20/40 sand

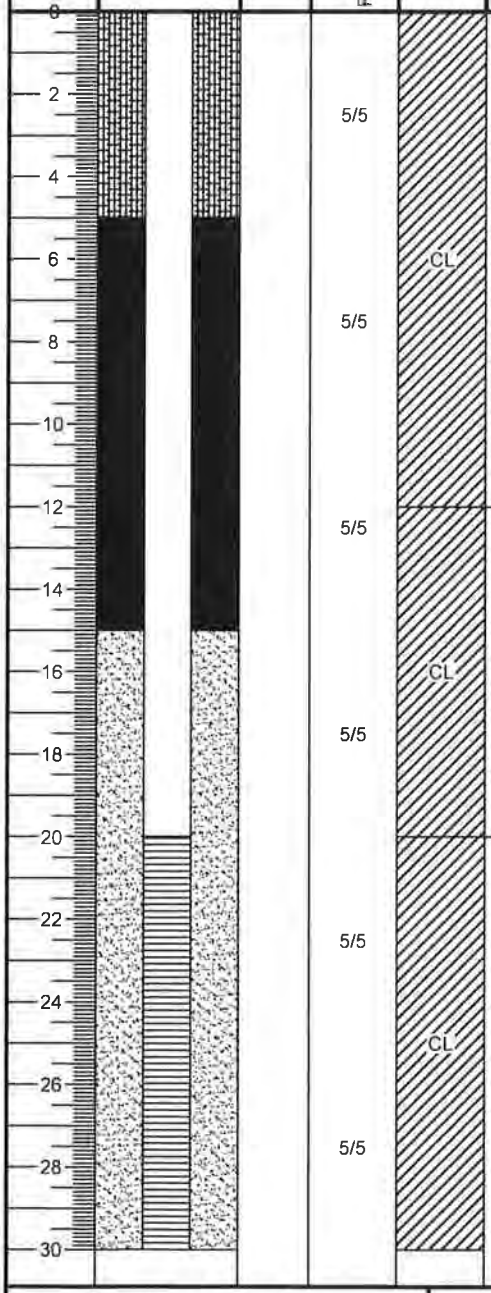
LUMINANT

Log of Boring: BMW-26

A-1 AREA LANDFILL
TATUM, TEXAS

PBW PROJECT No.: 5164-F

Completion Date:	8-31-16	Drilling Method:	HS Auger
Drilling Company:	Walker-Hill Env.	Borehole Diameter (in.):	10.25"
Driller:	Jeremy Thornhill	Total Depth (ft):	30.0'
Driller's License:	NA	Northing:	221187.022
Field Supervisor:	RKS	Easting:	2921306.755
Sampling Method:	5'Macrocore Sampler	Ground Elev. (ft AMSL):	365.958



Lithologic Description

0.0-12.0 - Clay with silt and lignite fragments, dark gray-black, soft, moist, low plasticity

Wet at 4.0'

12.0-20.0 - Silty clay, dark brown, saturated, low plasticity

20.0-30.0 - Silty clay, fine grained, dark brown, saturated, low plasticity

PBW
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Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:

1. All logged material is mine spoil.

Depth (bgs)	Well Materials
0' - 20'	Casing, 4" Sch 40 PVC, FJT
20' - 30'	Screen, 4" Sch 40 PVC, .010 Slot

Depth (bgs)	Annular Materials
0' - 5'	Grout
5' - 15'	Bentonite Pellet Seal
15' - 30'	20/40 Sand

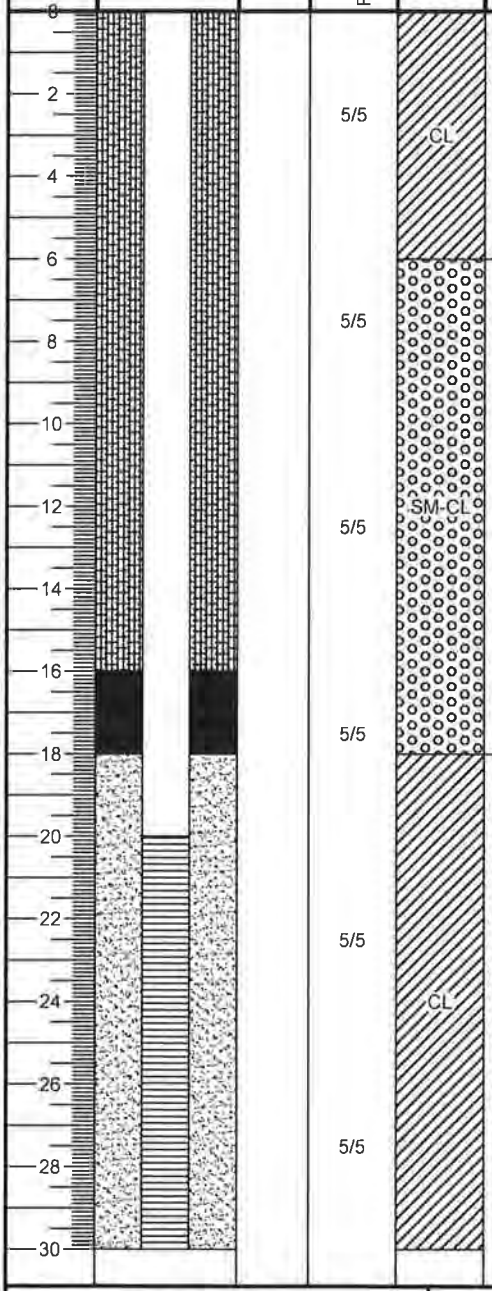
LUMINANT

Log of Boring: BMW-27

A-1 AREA LANDFILL
TATUM, TEXAS

PBW PROJECT No.: 5164-F

Completion Date:	9-1-16	Drilling Method:	HS Auger
Drilling Company:	Walker-Hill Env	Borehole Diameter (in.):	10 25"
Driller:	Jeremy Thornhill	Total Depth (ft):	30 0'
Driller's License:	NA	Northing	220024 389
Field Supervisor:	RKS	Easting	2922347 297
Sampling Method:	5'Macrocore Sampler	Ground Elev (ft AMSL):	373 463



Lithologic Description

0.0-6.0 - Clay with silt and fine sand, dark gray, soft, moist, low plasticity

Wet at 5 0'

6 0-18 0 - Silty sand with clay, brown, soft, moist

18.0-30.0 - Silty clay with lignite, dark brown-gray, wet, low plasticity

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

Notes:

1. All logged material is mine spoil.

Depth (bgs)	Well Materials
0' - 20'	Casing, 4" Sch 40 PVC, FJT
20' - 30'	Screen, 4" Sch 40 PVC, 010 Slot

Depth (bgs)	Annular Materials
0' - 16'	Grout
16' - 18'	Bentonite Pellet Seal
18' - 30'	20/40 Sand

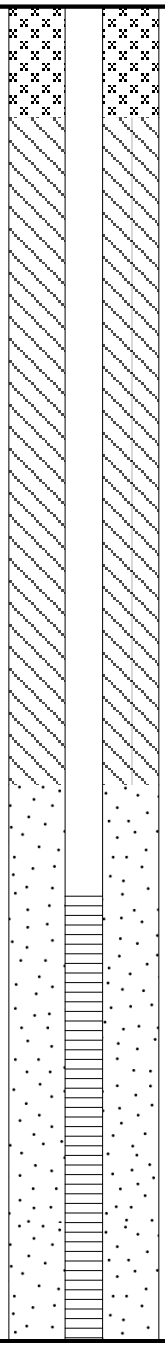
Luminant

Log of Boring: BMW-28

A-1 Area Landfill
Tatum, TX

PBW Project No. 5164F

Completion Date:	10/27/2016	Drilling Method:	HSA
Drilling Company:	ETTL	Borehole Diameter (in.):	10.25
Driller:	Tommy Cook	Total Depth (ft):	60
Driller's License:	2853	TOC Elevation (ft. AMSL):	373.208
Logged By:	Jeremiah Bihl	Northing:	
Sampling Method:	4"x10' Core barrel	Easting:	

Depth (ft)	Well Materials	USCS	Lithologic Description
0 – 14		ML	(0 - 14) Clayey SILT (spoil), black to brown, some pieces of coal, moist, low plasticity.
14 – 30		SM	(14 - 30) SAND with silt and small amounts of clay (spoil), some coal pieces, black, soft, dry, low plasticity.
30 – 60		CL	(30 - 60) CLAY with some silt (spoil), pieces of coal, soft, black to dark gray, dry, low plasticity, possible sandstone/siltstone boulder at 40'.

0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60

PBW

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

Notes:
1. This log should not be used separately from the report to which it is attached.
2. All logged material is mine spoil.

Well Materials
(0-40) Casing, 2" Sch 40 FJT PVC
(40-60) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-5') Grout
(5'-35') Bentonite pellets
(35'-60') 20/40 sand

Luminant

Log of Boring: BMW-29

Big Brown Steam Electric Station
Franklin, Texas

Golder Project No. 19122434E

Completion Date:	5/31/2019	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):	380.83
Logged By:	Kelsey Worley	Northing:	3565716
Sampling Method:	4"x10' Core barrel	Easting:	355228.3

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0				
5		1.8/10.0	NR	(0 - 8.2) No return
10			CH	(8.2 - 10) CLAY, some fine sand present, brown to gray, dry, firm, no plasticity
			NR	(10 - 12.7) No terturn
15		7.3/10.0	CH	(12.7 - 24) CLAY, dark gray, some organic staining, pieces of lignite present, slighlty moist, firm, moderate plasticity, fine to large lignite 21'-23.6'
20				
25		9.6/10.0	CL	(24 - 29.8) Silty CLAY, gray, moist, soft, moderate plasticity, minor sand conent at 28.2', Saturated at 29.8'
30				
35		9.4/10.0	SC	(29.8 - 40) Clayey SAND, fine to very fine sand, gray to brown, sand content decreases with depth, saturated, moist at 34.7, dry at 38.1
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.
2. Entire core is composed of mine spoil.

Well Materials
(+3.77 - 30) Casing, 2" Sch 40 FJT PVC
(30 - 40) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-25') Grout
(25'-28') Bentonite pellets
(28'-40') 20/40 sand

Luminant

Log of Boring: BMW-30

Big Brown Steam Electric Station
Franklin, Texas

Golder Project No. 19122434E

Completion Date:	5/30/2019	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6
Driller:	Rodney Labrosse	Total Depth (ft):	52
Driller's License:	60059	TOC Elevation (ft. AMSL):	363.35
Logged By:	Kelsey Worley	Northing:	3568008
Sampling Method:	4"x10' Core barrel	Easting:	357427.5

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0				
5		5.7/10.0	CL	(0 - 15.3) Sandy CLAY, dark gray, fine sand throughout, pebble to cobble size lignite throughout, trace Fe staining, roots in top 2', 9'-15.3' dark gray with light gray and some trace mottling
10				
15		6.8/10.0		
20				
25		6.8/10.0	CH	(15.3 - 33.8) CLAY, dark gray transition to mix of tan, orange, gray, mottle hard to very hard, moderate to high plastitcity, transition to greenish/ gray at 20', rooting at 25.2'
30		4.8/5.0		
35			LIG	(33.8 - 39.7) LIGNITE, fine to large cobble size pieces
40		7.0/7.0		
45		10.0/10.0	SC	(39.7 - 52) Clayey SAND, wet at 40' very fine sand in clay, light gray to gray with some black, very tight 42 to 46, wet again below 46'
50				

GOLDER
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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.
2. Entire core is composed of mine spoil.

Well Materials
(+3 - 42) Casing, 2" Sch 40 FJT PVC
(42 - 52) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-37') Grout
(37'-40') Bentonite pellets
(40'-52') 20/40 sand

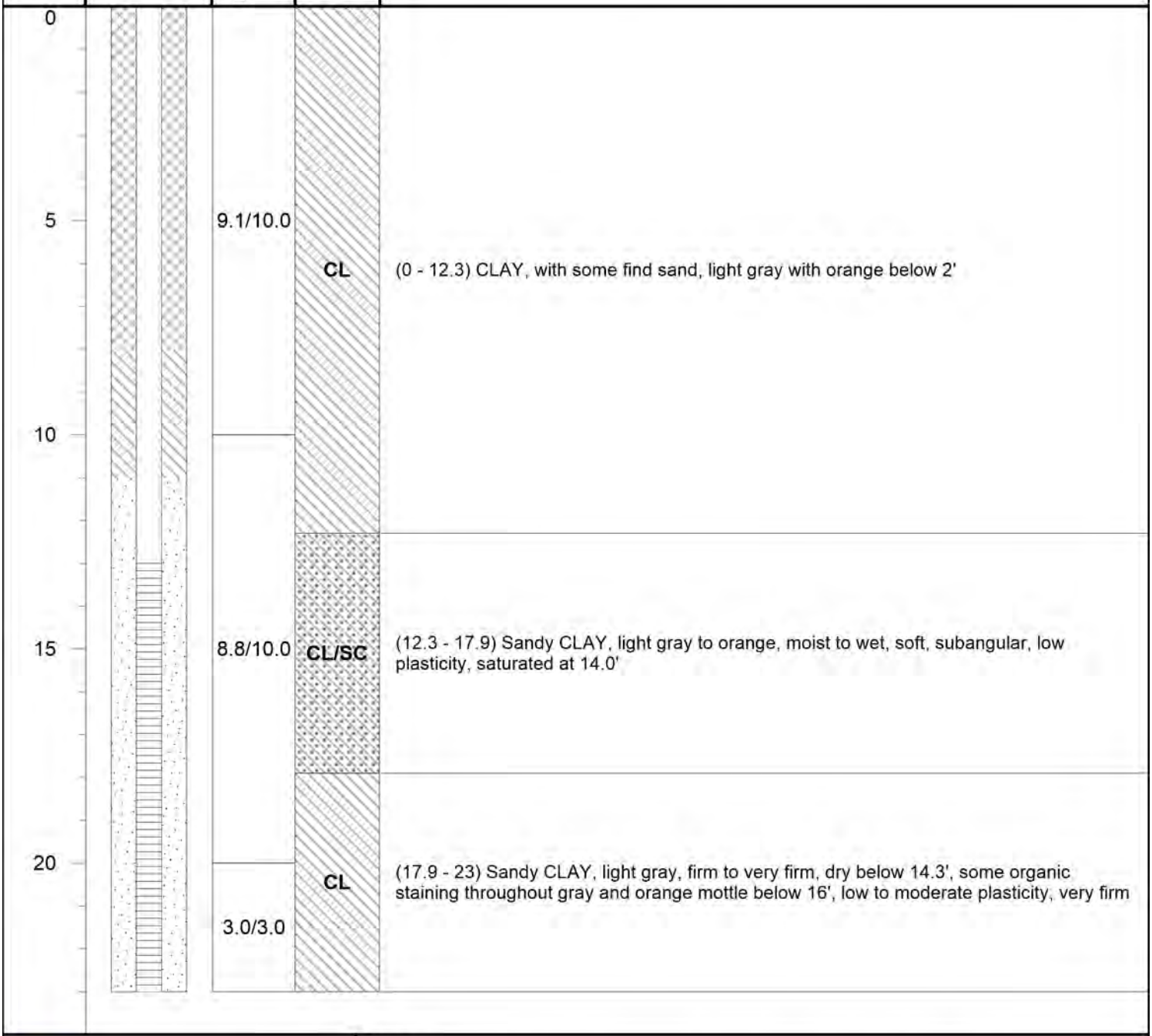
Luminant

Log of Boring: BMW-31

Big Brown Steam Electric Station
Franklin, Texas

Golder Project No. 19122434E

Completion Date:	5/31/2019	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6
Driller:	Rodney Labrosse	Total Depth (ft):	23
Driller's License:	60059	TOC Elevation (ft. AMSL):	324.33
Logged By:	Kelsey Worley	Northing:	3565972
Sampling Method:	4"x10' Core barrel	Easting:	357863.1



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.
2. Entire core is composed of mine spoil.

Well Materials
(+3.60 - 13) Casing, 2" Sch 40 FJT PVC
(13'- 23') Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-8') Grout
(8'-11') Bentonite pellets
(11'-23') 20/40 sand

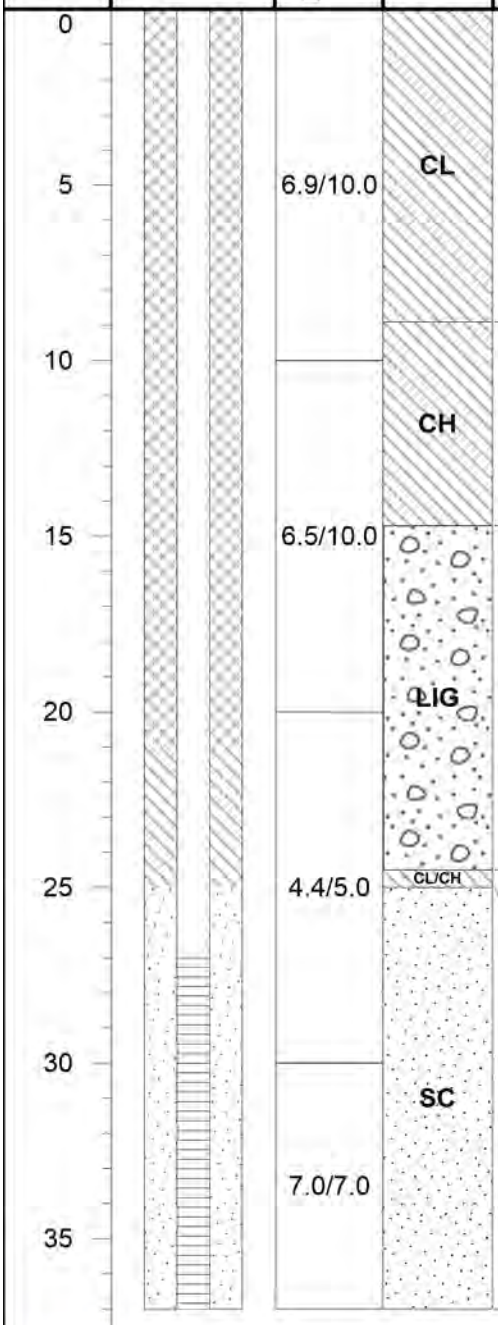
Luminant

Log of Boring: BMW-32

Big Brown Steam Electric Station
Franklin, Texas

Golder Project No. 19122434E

Completion Date:	5/29/2019	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6
Driller:	Rodney Labrosse	Total Depth (ft):	37
Driller's License:	60059	TOC Elevation (ft. AMSL):	344.09
Logged By:	Kelsey Worley	Northing:	3567175
Sampling Method:	4"x10' Core barrel	Easting:	357875



Lithologic Description
(0 - 8.9) CLAY fill material, organics and roots on the top foot, mix of tan gray and orange, some iron content, firm, trace sand, black coal pieces mixed in clay below 8.0'
(8.9 - 14.7) CLAY, mixture of clay with black staining, and lignite pieces, soft to firm, moist to wet, subangular, moderate to high plasticity
(14.7 - 24.5) LIGNITE, fine to large lignite pieces, subangular, wet at 22.5'-23.5' small to fine lignite, hard, black to brown, soft to hard
(24.5 - 25) CLAY, dark brown, black, dry, very hard, some orange streaks throughout with black staining
(25 - 37) Clayey SAND, gray with some oxidation, soft, round, low plasticity, sand is fine to very fine, increasing clay content with depth

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.
2. Entire core is composed of mine spoil.

Well Materials
(+3 - 27) Casing, 2" Sch 40 FJT PVC
(27 - 37) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-21') Grout
(21'-25') Bentonite pellets
(25'-37') 20/40 sand

Luminant

Log of Boring: BMW-33

Big Brown Steam Electric Station
Franklin, Texas

Golder Project No. 19122434E

Completion Date:	5/30/2019	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6
Driller:	Rodney Labrosse	Total Depth (ft):	48
Driller's License:	60059	TOC Elevation (ft. AMSL):	427.7
Logged By:	Sergio Ruiz	Northing:	3568008
Sampling Method:	4"x10' Core barrel	Easting:	357427.5

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0				
5		6.2/10.0	SP	(0 - 16.7) SAND, fine grained, wet, soft, subround, no plasticity, mix of orange, light orange, few gray clay lenses, thick clay lense 7.3' to 7.8', saturated at 11', trace organics in top 1'
10				
15		6.4/10.0		
			CH	(16.7 - 18.4) CLAY, dark gray, moist, very firm, high plasticity
20				
25		7.3/10.0		
30				
35		6.1/10.0	SC	(18.4 - 48.9) Clayey SAND, wet below 20', mix of gray, light gray, and tan, soft to firm, large pieces of lignite 18.5' to 20' and mixed throughout, dark gray fat clay lense 27.7'-28.2', mixed clay nodules below 29', saturated at 38',
40				
45		6.9/9.0		
				(48.9 - 49) CLAY , gray stiff, with some sand throughout, some black lignite pieces
50				

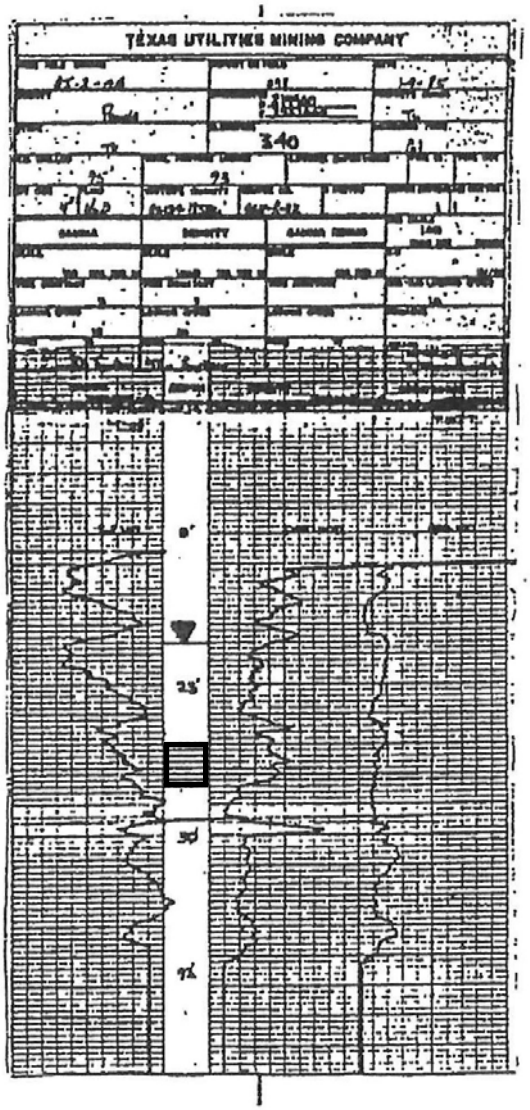
GOLDER
2201 Double Creek Dr., Suite 4004
Round Rock, Texas 78664
O·512.671.3434 F·512.671.3446

Notes:
1. This log should not be used separately from the report to which it is attached.
2. Entire core is composed of mine spoil.

Well Materials
(+3 - 38) Casing, 2" Sch 40 FJT PVC
(38 - 48) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-32') Grout
(32'-36') Bentonite pellets
(36'-48') 20/40 sand

AI-2-OB



APPENDIX B

LABORATORY ANALYTICAL REPORTS

June 18, 2019

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

Order No.: 1905185

RE: Luminant-A1 Landfill

Dear Will Vienne:

DHL Analytical, Inc. received 11 sample(s) on 5/16/2019 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

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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

№ 82167

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: 5-15-19 PAGE 1 OF 1
PO #: DHL WORK ORDER #: 1905185
PROJECT LOCATION OR NAME: LUMINANT - AL LANDFILL
CLENT PROJECT #: 19122262-D COLLECTOR: J. BRAYDON

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 HNO_3 H_2O $Na_2B_4O_7$ + K | FERROUS AND FERRIC IRON

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES	FIELD NOTES
BMW-24	01	5-15-19	0735	W		7						X X X	
BMW-23	02		0825	W		7						X X X	
BMW-22	03		0915	W		7						X X X	
BMW-21	04		0955	W		7						X X X	
BMW-27	05		1055	W		7						X X X	
BMW-26	06		1140	W		7						X X X	
BMW-11AR	07		1235	W		7						X X X	
BMW-19	08		1325	W		7						X X X	
BMW-18	09		1410	W		7						X X X	
BMW-28	10		1500	W		7						X X X	
BMW-20	11		1600	W		7						X X X	

RELINQUISHED BY: (Signature) DATE/TIME 5-16-19 9:15 RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME 5-16-19 11:21 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: 1.3/0.7/1.0/2.3 THERM #: 73
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: 5/16/2019

Work Order Number 1905185 | Received by EL

Checklist completed by: _____ (Signature) 5/16/2019 (Date) | Reviewed by DL (Initials) 5/16/2019 (Date)

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ~~☑~~ EL 5/16/19	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 ☐	1.3 °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: One VOA for sample "B/MW-23" broken in Login.

Corrective Action Proceed w/ 2 remaining unbroken VOAs

DHL Analytical, Inc. **Date:** *18-Jun-19*

CLIENT: Golder
Project: Luminant-A1 Landfill
Lab Order: 1905185

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 5/16/19. A total of 11 samples were received. For sample BMW-23 one VOA vial was broken in login. Proceeded with analysis of Ferrous Iron with the remaining two VOA vials. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 5/22/19 the matrix spike and matrix spike duplicate recoveries were out of control limits for three analytes. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was from this work order. The LCS was within control limits for these analytes. No further corrective actions were taken.

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT: Golder
Project: Luminant-A1 Landfill
Lab Order: 1905185

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1905185-01	BMW-24		05/15/19 07:35 AM	5/16/2019
1905185-02	BMW-23		05/15/19 08:25 AM	5/16/2019
1905185-03	BMW-22		05/15/19 09:15 AM	5/16/2019
1905185-04	BMW-21		05/15/19 09:55 AM	5/16/2019
1905185-05	BMW-27		05/15/19 10:55 AM	5/16/2019
1905185-06	BMW-26		05/15/19 11:40 AM	5/16/2019
1905185-07	BMW-11AR		05/15/19 12:35 PM	5/16/2019
1905185-08	BMW-19		05/15/19 01:25 PM	5/16/2019
1905185-09	BMW-18		05/15/19 02:10 PM	5/16/2019
1905185-10	BMW-28		05/15/19 03:00 PM	5/16/2019
1905185-11	BMW-20		05/15/19 04:00 PM	5/16/2019

Lab Order: 1905185
Client: Golder
Project: Luminant-A1 Landfill

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905185-01A	BMW-24	05/15/19 07:35 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905185-01B	BMW-24	05/15/19 07:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-24	05/15/19 07:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-24	05/15/19 07:35 AM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905185-01C	BMW-24	05/15/19 07:35 AM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	BMW-24	05/15/19 07:35 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-24	05/15/19 07:35 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-24	05/15/19 07:35 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	BMW-24	05/15/19 07:35 AM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001
1905185-02A	BMW-23	05/15/19 08:25 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905185-02B	BMW-23	05/15/19 08:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-23	05/15/19 08:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-23	05/15/19 08:25 AM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905185-02C	BMW-23	05/15/19 08:25 AM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	BMW-23	05/15/19 08:25 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-23	05/15/19 08:25 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-23	05/15/19 08:25 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	BMW-23	05/15/19 08:25 AM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001
1905185-03A	BMW-22	05/15/19 09:15 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905185-03B	BMW-22	05/15/19 09:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-22	05/15/19 09:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-22	05/15/19 09:15 AM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905185-03C	BMW-22	05/15/19 09:15 AM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	BMW-22	05/15/19 09:15 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-22	05/15/19 09:15 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-22	05/15/19 09:15 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	BMW-22	05/15/19 09:15 AM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001
1905185-04A	BMW-21	05/15/19 09:55 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002

Lab Order: 1905185
Client: Golder
Project: Luminant-A1 Landfill

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905185-04B	BMW-21	05/15/19 09:55 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-21	05/15/19 09:55 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-21	05/15/19 09:55 AM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905185-04C	BMW-21	05/15/19 09:55 AM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	BMW-21	05/15/19 09:55 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-21	05/15/19 09:55 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-21	05/15/19 09:55 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	BMW-21	05/15/19 09:55 AM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001
1905185-05A	BMW-27	05/15/19 10:55 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905185-05B	BMW-27	05/15/19 10:55 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-27	05/15/19 10:55 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-27	05/15/19 10:55 AM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905185-05C	BMW-27	05/15/19 10:55 AM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	BMW-27	05/15/19 10:55 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-27	05/15/19 10:55 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-27	05/15/19 10:55 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	BMW-27	05/15/19 10:55 AM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001
1905185-06A	BMW-26	05/15/19 11:40 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905185-06B	BMW-26	05/15/19 11:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-26	05/15/19 11:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-26	05/15/19 11:40 AM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905185-06C	BMW-26	05/15/19 11:40 AM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	BMW-26	05/15/19 11:40 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-26	05/15/19 11:40 AM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-26	05/15/19 11:40 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	BMW-26	05/15/19 11:40 AM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001
1905185-07A	BMW-11AR	05/15/19 12:35 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905185-07B	BMW-11AR	05/15/19 12:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989

Lab Order: 1905185
Client: Golder
Project: Luminant-A1 Landfill

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905185-07B	BMW-11AR	05/15/19 12:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-11AR	05/15/19 12:35 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905185-07C	BMW-11AR	05/15/19 12:35 PM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	BMW-11AR	05/15/19 12:35 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-11AR	05/15/19 12:35 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-11AR	05/15/19 12:35 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	BMW-11AR	05/15/19 12:35 PM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001
1905185-08A	BMW-19	05/15/19 01:25 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905185-08B	BMW-19	05/15/19 01:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-19	05/15/19 01:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-19	05/15/19 01:25 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905185-08C	BMW-19	05/15/19 01:25 PM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	BMW-19	05/15/19 01:25 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-19	05/15/19 01:25 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-19	05/15/19 01:25 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90964
	BMW-19	05/15/19 01:25 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	BMW-19	05/15/19 01:25 PM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001
1905185-09A	BMW-18	05/15/19 02:10 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905185-09B	BMW-18	05/15/19 02:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-18	05/15/19 02:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-18	05/15/19 02:10 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905185-09C	BMW-18	05/15/19 02:10 PM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	BMW-18	05/15/19 02:10 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-18	05/15/19 02:10 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-18	05/15/19 02:10 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	BMW-18	05/15/19 02:10 PM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001
1905185-10A	BMW-28	05/15/19 03:00 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905185-10B	BMW-28	05/15/19 03:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989

Lab Order: 1905185
Client: Golder
Project: Luminant-A1 Landfill

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905185-10B	BMW-28	05/15/19 03:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-28	05/15/19 03:00 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905185-10C	BMW-28	05/15/19 03:00 PM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	BMW-28	05/15/19 03:00 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-28	05/15/19 03:00 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-28	05/15/19 03:00 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90964
	BMW-28	05/15/19 03:00 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	BMW-28	05/15/19 03:00 PM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001
1905185-11A	BMW-20	05/15/19 04:00 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905185-11B	BMW-20	05/15/19 04:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-20	05/15/19 04:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	BMW-20	05/15/19 04:00 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905185-11C	BMW-20	05/15/19 04:00 PM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	BMW-20	05/15/19 04:00 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-20	05/15/19 04:00 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	BMW-20	05/15/19 04:00 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	BMW-20	05/15/19 04:00 PM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001

Lab Order: 1905185
Client: Golder
Project: Luminant-A1 Landfill

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905185-01A	BMW-24	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	BMW-24	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 03:58 PM	UV/VIS_2_190520A
1905185-01B	BMW-24	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 09:39 AM	CETAC2_HG_190524A
	BMW-24	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 02:56 PM	ICP-MS4_190522D
	BMW-24	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	10	05/23/19 11:22 AM	ICP-MS4_190523A
1905185-01C	BMW-24	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 01:18 PM	TITRATOR_190517A
	BMW-24	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 06:01 PM	IC2_190516B
	BMW-24	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 01:13 AM	IC2_190516B
	BMW-24	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:47 PM	UV/VIS_2_190516B
	BMW-24	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A
1905185-02A	BMW-23	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	BMW-23	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 04:00 PM	UV/VIS_2_190520A
1905185-02B	BMW-23	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 09:42 AM	CETAC2_HG_190524A
	BMW-23	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 02:58 PM	ICP-MS4_190522D
	BMW-23	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	20	05/23/19 11:24 AM	ICP-MS4_190523A
1905185-02C	BMW-23	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 01:36 PM	TITRATOR_190517A
	BMW-23	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 06:17 PM	IC2_190516B
	BMW-23	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 01:29 AM	IC2_190516B
	BMW-23	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:47 PM	UV/VIS_2_190516B
	BMW-23	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A
1905185-03A	BMW-22	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	BMW-22	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 04:00 PM	UV/VIS_2_190520A
1905185-03B	BMW-22	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 09:44 AM	CETAC2_HG_190524A
	BMW-22	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:00 PM	ICP-MS4_190522D
	BMW-22	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	20	05/23/19 11:26 AM	ICP-MS4_190523A
1905185-03C	BMW-22	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 02:01 PM	TITRATOR_190517A

Lab Order: 1905185
Client: Golder
Project: Luminant-A1 Landfill

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905185-03C	BMW-22	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 01:45 AM	IC2_190516B
	BMW-22	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 06:33 PM	IC2_190516B
	BMW-22	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:48 PM	UV/VIS_2_190516B
	BMW-22	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A
1905185-04A	BMW-21	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	BMW-21	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 04:00 PM	UV/VIS_2_190520A
1905185-04B	BMW-21	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 09:46 AM	CETAC2_HG_190524A
	BMW-21	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:02 PM	ICP-MS4_190522D
	BMW-21	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	20	05/23/19 11:28 AM	ICP-MS4_190523A
1905185-04C	BMW-21	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 02:47 PM	TITRATOR_190517A
	BMW-21	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 06:49 PM	IC2_190516B
	BMW-21	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 02:01 AM	IC2_190516B
	BMW-21	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:48 PM	UV/VIS_2_190516B
	BMW-21	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A
1905185-05A	BMW-27	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	BMW-27	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 04:01 PM	UV/VIS_2_190520A
1905185-05B	BMW-27	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 09:48 AM	CETAC2_HG_190524A
	BMW-27	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	20	05/23/19 11:30 AM	ICP-MS4_190523A
	BMW-27	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:04 PM	ICP-MS4_190522D
1905185-05C	BMW-27	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 03:13 PM	TITRATOR_190517A
	BMW-27	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 07:05 PM	IC2_190516B
	BMW-27	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 02:17 AM	IC2_190516B
	BMW-27	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:48 PM	UV/VIS_2_190516B
	BMW-27	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A
1905185-06A	BMW-26	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	BMW-26	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 04:01 PM	UV/VIS_2_190520A

Lab Order: 1905185
Client: Golder
Project: Luminant-A1 Landfill

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905185-06B	BMW-26	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 09:51 AM	CETAC2_HG_190524A
	BMW-26	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 02:52 PM	ICP-MS4_190522D
	BMW-26	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	20	05/23/19 11:18 AM	ICP-MS4_190523A
1905185-06C	BMW-26	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 03:40 PM	TITRATOR_190517A
	BMW-26	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 02:33 AM	IC2_190516B
	BMW-26	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 07:21 PM	IC2_190516B
	BMW-26	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:49 PM	UV/VIS_2_190516B
	BMW-26	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A
1905185-07A	BMW-11AR	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	BMW-11AR	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 04:01 PM	UV/VIS_2_190520A
1905185-07B	BMW-11AR	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 09:53 AM	CETAC2_HG_190524A
	BMW-11AR	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:06 PM	ICP-MS4_190522D
	BMW-11AR	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	10	05/23/19 11:32 AM	ICP-MS4_190523A
1905185-07C	BMW-11AR	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 03:59 PM	TITRATOR_190517A
	BMW-11AR	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 07:37 PM	IC2_190516B
	BMW-11AR	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 02:49 AM	IC2_190516B
	BMW-11AR	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:49 PM	UV/VIS_2_190516B
	BMW-11AR	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A
1905185-08A	BMW-19	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	BMW-19	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 04:02 PM	UV/VIS_2_190520A
1905185-08B	BMW-19	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 09:55 AM	CETAC2_HG_190524A
	BMW-19	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:07 PM	ICP-MS4_190522D
	BMW-19	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	20	05/23/19 11:34 AM	ICP-MS4_190523A
1905185-08C	BMW-19	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 04:15 PM	TITRATOR_190517A
	BMW-19	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 07:53 PM	IC2_190516B
	BMW-19	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 03:05 AM	IC2_190516B

Lab Order: 1905185
Client: Golder
Project: Luminant-A1 Landfill

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905185-08C	BMW-19	Aqueous	E300	Anions by IC method - Water	90964	100	05/17/19 04:09 PM	IC2_190517B
	BMW-19	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:49 PM	UV/VIS_2_190516B
	BMW-19	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A
1905185-09A	BMW-18	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	BMW-18	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 04:02 PM	UV/VIS_2_190520A
1905185-09B	BMW-18	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 09:58 AM	CETAC2_HG_190524A
	BMW-18	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	20	05/23/19 11:36 AM	ICP-MS4_190523A
	BMW-18	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:09 PM	ICP-MS4_190522D
1905185-09C	BMW-18	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 04:24 PM	TITRATOR_190517A
	BMW-18	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 08:09 PM	IC2_190516B
	BMW-18	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 03:21 AM	IC2_190516B
	BMW-18	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:50 PM	UV/VIS_2_190516B
	BMW-18	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A
1905185-10A	BMW-28	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	BMW-28	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 04:02 PM	UV/VIS_2_190520A
1905185-10B	BMW-28	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 10:04 AM	CETAC2_HG_190524A
	BMW-28	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:11 PM	ICP-MS4_190522D
	BMW-28	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	50	05/23/19 11:38 AM	ICP-MS4_190523A
1905185-10C	BMW-28	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 04:49 PM	TITRATOR_190517A
	BMW-28	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 08:25 PM	IC2_190516B
	BMW-28	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 03:37 AM	IC2_190516B
	BMW-28	Aqueous	E300	Anions by IC method - Water	90964	100	05/17/19 04:25 PM	IC2_190517B
	BMW-28	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:50 PM	UV/VIS_2_190516B
	BMW-28	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A
1905185-11A	BMW-20	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	BMW-20	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 04:02 PM	UV/VIS_2_190520A

Lab Order: 1905185
Client: Golder
Project: Luminant-A1 Landfill

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905185-11B	BMW-20	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 10:07 AM	CETAC2_HG_190524A
	BMW-20	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:50 PM	ICP-MS4_190522D
	BMW-20	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	20	05/23/19 11:53 AM	ICP-MS4_190523A
1905185-11C	BMW-20	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 05:15 PM	TITRATOR_190517A
	BMW-20	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 10:01 PM	IC2_190516B
	BMW-20	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 04:57 AM	IC2_190516B
	BMW-20	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:52 PM	UV/VIS_2_190516B
	BMW-20	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-24
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-01
Project No:	19122262-D	**Collection Date:**	05/15/19 07:35 AM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 02:56 PM
Arsenic	0.00272	0.00200	0.00500	J	mg/L	1	05/22/19 02:56 PM
Barium	0.221	0.00300	0.0100		mg/L	1	05/22/19 02:56 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 02:56 PM
Boron	0.601	0.0100	0.0300		mg/L	1	05/22/19 02:56 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 02:56 PM
Calcium	57.9	1.00	3.00		mg/L	10	05/23/19 11:22 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 02:56 PM
Cobalt	0.00643	0.00300	0.00500		mg/L	1	05/22/19 02:56 PM
Iron	35.1	0.300	1.00		mg/L	10	05/23/19 11:22 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 02:56 PM
Lithium	0.0512	0.00500	0.0100		mg/L	1	05/22/19 02:56 PM
Magnesium	57.5	1.00	3.00		mg/L	10	05/23/19 11:22 AM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 02:56 PM
Potassium	3.22	0.100	0.300		mg/L	1	05/22/19 02:56 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 02:56 PM
Sodium	119	1.00	3.00		mg/L	10	05/23/19 11:22 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 02:56 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 09:39 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	169	3.00	10.0		mg/L	10	05/17/19 01:13 AM
Fluoride	0.219	0.100	0.400	J	mg/L	1	05/16/19 06:01 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/16/19 06:01 PM
Sulfate	280	10.0	30.0		mg/L	10	05/17/19 01:13 AM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	176	10.0	20.0		mg/L @ pH 4.53	1	05/17/19 01:18 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	05/17/19 01:18 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	05/17/19 01:18 PM
Alkalinity, Total (As CaCO3)	176	20.0	20.0		mg/L @ pH 4.53	1	05/17/19 01:18 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	35.1	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: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-24
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-01
Project No:	19122262-D	**Collection Date:**	05/15/19 07:35 AM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.0510	0.0300	0.100	J	mg/L	1	05/16/19 02:47 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	881	10.0	10.0		mg/L	1	05/20/19 04:45 PM

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-23
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-02
Project No:	19122262-D	**Collection Date:**	05/15/19 08:25 AM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 02:58 PM
Arsenic	0.00240	0.00200	0.00500	J	mg/L	1	05/22/19 02:58 PM
Barium	0.0381	0.00300	0.0100		mg/L	1	05/22/19 02:58 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 02:58 PM
Boron	1.31	0.0100	0.0300		mg/L	1	05/22/19 02:58 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 02:58 PM
Calcium	89.9	2.00	6.00		mg/L	20	05/23/19 11:24 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 02:58 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 02:58 PM
Iron	9.64	0.0300	0.100		mg/L	1	05/22/19 02:58 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 02:58 PM
Lithium	0.0951	0.00500	0.0100		mg/L	1	05/22/19 02:58 PM
Magnesium	92.2	2.00	6.00		mg/L	20	05/23/19 11:24 AM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 02:58 PM
Potassium	4.28	0.100	0.300		mg/L	1	05/22/19 02:58 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 02:58 PM
Sodium	311	2.00	6.00		mg/L	20	05/23/19 11:24 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 02:58 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 09:42 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	240	3.00	10.0		mg/L	10	05/17/19 01:29 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/16/19 06:17 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/16/19 06:17 PM
Sulfate	613	10.0	30.0		mg/L	10	05/17/19 01:29 AM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	414	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 01:36 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 01:36 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 01:36 PM
Alkalinity, Total (As CaCO3)	414	20.0	20.0		mg/L @ pH 4.54	1	05/17/19 01:36 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	9.55	0.0500	0.100	N	mg/L	1	05/24/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	0.0937	0.0500	0.100	JN	mg/L	1	05/20/19 04:00 PM

Qualifiers:

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-23
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-02
Project No:	19122262-D	**Collection Date:**	05/15/19 08:25 AM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.202	0.0300	0.100		mg/L	1	05/16/19 02:47 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1640	50.0	50.0		mg/L	1	05/20/19 04:45 PM

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-22
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-03
Project No:	19122262-D	**Collection Date:**	05/15/19 09:15 AM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:00 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:00 PM
Barium	0.0618	0.00300	0.0100		mg/L	1	05/22/19 03:00 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:00 PM
Boron	3.39	0.200	0.600		mg/L	20	05/23/19 11:26 AM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:00 PM
Calcium	198	2.00	6.00		mg/L	20	05/23/19 11:26 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:00 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 03:00 PM
Iron	9.99	0.0300	0.100		mg/L	1	05/22/19 03:00 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:00 PM
Lithium	0.0779	0.00500	0.0100		mg/L	1	05/22/19 03:00 PM
Magnesium	155	2.00	6.00		mg/L	20	05/23/19 11:26 AM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:00 PM
Potassium	6.15	0.100	0.300		mg/L	1	05/22/19 03:00 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:00 PM
Sodium	265	2.00	6.00		mg/L	20	05/23/19 11:26 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 03:00 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 09:44 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	311	3.00	10.0		mg/L	10	05/17/19 01:45 AM
Fluoride	0.351	0.100	0.400	J	mg/L	1	05/16/19 06:33 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/16/19 06:33 PM
Sulfate	967	10.0	30.0		mg/L	10	05/17/19 01:45 AM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	474	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 02:01 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 02:01 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 02:01 PM
Alkalinity, Total (As CaCO3)	474	20.0	20.0		mg/L @ pH 4.54	1	05/17/19 02:01 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	9.99	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 04:00 PM

Qualifiers:

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-22
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-03
Project No:	19122262-D	**Collection Date:**	05/15/19 09:15 AM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.0540	0.0300	0.100	J	mg/L	1	05/16/19 02:48 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2260	50.0	50.0		mg/L	1	05/20/19 04:45 PM

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-21
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-04
Project No:	19122262-D	**Collection Date:**	05/15/19 09:55 AM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:02 PM
Arsenic	0.00399	0.00200	0.00500	J	mg/L	1	05/22/19 03:02 PM
Barium	0.0412	0.00300	0.0100		mg/L	1	05/22/19 03:02 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:02 PM
Boron	0.994	0.0100	0.0300		mg/L	1	05/22/19 03:02 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:02 PM
Calcium	147	2.00	6.00		mg/L	20	05/23/19 11:28 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:02 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 03:02 PM
Iron	1.02	0.0300	0.100		mg/L	1	05/22/19 03:02 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:02 PM
Lithium	0.0613	0.00500	0.0100		mg/L	1	05/22/19 03:02 PM
Magnesium	138	2.00	6.00		mg/L	20	05/23/19 11:28 AM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:02 PM
Potassium	5.21	0.100	0.300		mg/L	1	05/22/19 03:02 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:02 PM
Sodium	386	2.00	6.00		mg/L	20	05/23/19 11:28 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 03:02 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 09:46 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	428	3.00	10.0		mg/L	10	05/17/19 02:01 AM
Fluoride	0.366	0.100	0.400	J	mg/L	1	05/16/19 06:49 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/16/19 06:49 PM
Sulfate	474	10.0	30.0		mg/L	10	05/17/19 02:01 AM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	780	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 02:47 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 02:47 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 02:47 PM
Alkalinity, Total (As CaCO3)	780	20.0	20.0		mg/L @ pH 4.54	1	05/17/19 02:47 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	1.02	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 04:00 PM

Qualifiers:

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-21
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-04
Project No:	19122262-D	**Collection Date:**	05/15/19 09:55 AM
Lab Order:	1905185	**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	05/16/19 02:48 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1980	50.0	50.0		mg/L	1	05/20/19 04:45 PM

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-27
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-05
Project No:	19122262-D	**Collection Date:**	05/15/19 10:55 AM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:04 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:04 PM
Barium	0.0238	0.00300	0.0100		mg/L	1	05/22/19 03:04 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:04 PM
Boron	0.460	0.0100	0.0300		mg/L	1	05/22/19 03:04 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:04 PM
Calcium	190	2.00	6.00		mg/L	20	05/23/19 11:30 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:04 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 03:04 PM
Iron	0.0447	0.0300	0.100	J	mg/L	1	05/22/19 03:04 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:04 PM
Lithium	0.0943	0.00500	0.0100		mg/L	1	05/22/19 03:04 PM
Magnesium	122	2.00	6.00		mg/L	20	05/23/19 11:30 AM
Molybdenum	0.00204	0.00200	0.00500	J	mg/L	1	05/22/19 03:04 PM
Potassium	12.5	0.100	0.300		mg/L	1	05/22/19 03:04 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:04 PM
Sodium	251	2.00	6.00		mg/L	20	05/23/19 11:30 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 03:04 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 09:48 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	129	3.00	10.0		mg/L	10	05/17/19 02:17 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/16/19 07:05 PM
Nitrate-N	0.798	0.100	0.500		mg/L	1	05/16/19 07:05 PM
Sulfate	674	10.0	30.0		mg/L	10	05/17/19 02:17 AM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	783	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:13 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:13 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:13 PM
Alkalinity, Total (As CaCO3)	783	20.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:13 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	<0.0500	0.0500	0.100	N	mg/L	1	05/20/19 04:01 PM

Qualifiers:

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-27
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-05
Project No:	19122262-D	**Collection Date:**	05/15/19 10:55 AM
Lab Order:	1905185	**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	05/16/19 02:48 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1840	50.0	50.0		mg/L	1	05/20/19 04:45 PM

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-26
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-06
Project No:	19122262-D	**Collection Date:**	05/15/19 11:40 AM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 02:52 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 02:52 PM
Barium	0.0253	0.00300	0.0100		mg/L	1	05/22/19 02:52 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 02:52 PM
Boron	0.449	0.0100	0.0300		mg/L	1	05/22/19 02:52 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 02:52 PM
Calcium	200	2.00	6.00		mg/L	20	05/23/19 11:18 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 02:52 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 02:52 PM
Iron	<0.0300	0.0300	0.100		mg/L	1	05/22/19 02:52 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 02:52 PM
Lithium	0.101	0.00500	0.0100		mg/L	1	05/22/19 02:52 PM
Magnesium	130	2.00	6.00		mg/L	20	05/23/19 11:18 AM
Molybdenum	0.00218	0.00200	0.00500	J	mg/L	1	05/22/19 02:52 PM
Potassium	13.3	0.100	0.300		mg/L	1	05/22/19 02:52 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 02:52 PM
Sodium	265	2.00	6.00		mg/L	20	05/23/19 11:18 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 02:52 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 09:51 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	135	3.00	10.0		mg/L	10	05/17/19 02:33 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/16/19 07:21 PM
Nitrate-N	0.851	0.100	0.500		mg/L	1	05/16/19 07:21 PM
Sulfate	706	10.0	30.0		mg/L	10	05/17/19 02:33 AM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	828	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:40 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:40 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:40 PM
Alkalinity, Total (As CaCO3)	828	20.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:40 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 04:01 PM

Qualifiers:

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-26
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-06
Project No:	19122262-D	**Collection Date:**	05/15/19 11:40 AM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.0340	0.0300	0.100	J	mg/L	1	05/16/19 02:49 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1930	50.0	50.0		mg/L	1	05/20/19 04:45 PM

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-11AR
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-07
Project No:	19122262-D	**Collection Date:**	05/15/19 12:35 PM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:06 PM
Arsenic	0.00208	0.00200	0.00500	J	mg/L	1	05/22/19 03:06 PM
Barium	0.0399	0.00300	0.0100		mg/L	1	05/22/19 03:06 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:06 PM
Boron	0.374	0.0100	0.0300		mg/L	1	05/22/19 03:06 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:06 PM
Calcium	138	1.00	3.00		mg/L	10	05/23/19 11:32 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:06 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 03:06 PM
Iron	1.35	0.0300	0.100		mg/L	1	05/22/19 03:06 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:06 PM
Lithium	0.0404	0.00500	0.0100		mg/L	1	05/22/19 03:06 PM
Magnesium	64.6	1.00	3.00		mg/L	10	05/23/19 11:32 AM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:06 PM
Potassium	20.3	0.100	0.300		mg/L	1	05/22/19 03:06 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:06 PM
Sodium	90.4	1.00	3.00		mg/L	10	05/23/19 11:32 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 03:06 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 09:53 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	6.11	0.300	1.00		mg/L	1	05/16/19 07:37 PM
Fluoride	0.198	0.100	0.400	J	mg/L	1	05/16/19 07:37 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/16/19 07:37 PM
Sulfate	324	10.0	30.0		mg/L	10	05/17/19 02:49 AM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	527	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:59 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:59 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:59 PM
Alkalinity, Total (As CaCO3)	527	20.0	20.0		mg/L @ pH 4.54	1	05/17/19 03:59 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	1.35	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 04:01 PM

Qualifiers:

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-11AR
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-07
Project No:	19122262-D	**Collection Date:**	05/15/19 12:35 PM
Lab Order:	1905185	**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	05/16/19 02:49 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	970	10.0	10.0		mg/L	1	05/20/19 04:45 PM

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-19
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-08
Project No:	19122262-D	**Collection Date:**	05/15/19 01:25 PM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:07 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:07 PM
Barium	0.0104	0.00300	0.0100		mg/L	1	05/22/19 03:07 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:07 PM
Boron	0.474	0.0100	0.0300		mg/L	1	05/22/19 03:07 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:07 PM
Calcium	388	2.00	6.00		mg/L	20	05/23/19 11:34 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:07 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 03:07 PM
Iron	0.750	0.0300	0.100		mg/L	1	05/22/19 03:07 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:07 PM
Lithium	0.0647	0.00500	0.0100		mg/L	1	05/22/19 03:07 PM
Magnesium	216	2.00	6.00		mg/L	20	05/23/19 11:34 AM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:07 PM
Potassium	11.7	0.100	0.300		mg/L	1	05/22/19 03:07 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:07 PM
Sodium	135	2.00	6.00		mg/L	20	05/23/19 11:34 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 03:07 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 09:55 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	4.66	0.300	1.00		mg/L	1	05/16/19 07:53 PM
Fluoride	0.189	0.100	0.400	J	mg/L	1	05/16/19 07:53 PM
Nitrate-N	1.35	0.100	0.500		mg/L	1	05/16/19 07:53 PM
Sulfate	1760	100	300		mg/L	100	05/17/19 04:09 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	482	10.0	20.0		mg/L @ pH 4.53	1	05/17/19 04:15 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	05/17/19 04:15 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	05/17/19 04:15 PM
Alkalinity, Total (As CaCO3)	482	20.0	20.0		mg/L @ pH 4.53	1	05/17/19 04:15 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.750	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 04:02 PM

Qualifiers:

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-19
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-08
Project No:	19122262-D	**Collection Date:**	05/15/19 01:25 PM
Lab Order:	1905185	**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	05/16/19 02:49 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3090	50.0	50.0		mg/L	1	05/20/19 04:45 PM

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-18
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-09
Project No:	19122262-D	**Collection Date:**	05/15/19 02:10 PM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:09 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:09 PM
Barium	0.0362	0.00300	0.0100		mg/L	1	05/22/19 03:09 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:09 PM
Boron	0.443	0.0100	0.0300		mg/L	1	05/22/19 03:09 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:09 PM
Calcium	7.91	0.100	0.300		mg/L	1	05/22/19 03:09 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:09 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 03:09 PM
Iron	0.0676	0.0300	0.100	J	mg/L	1	05/22/19 03:09 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:09 PM
Lithium	0.0160	0.00500	0.0100		mg/L	1	05/22/19 03:09 PM
Magnesium	2.47	0.100	0.300		mg/L	1	05/22/19 03:09 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:09 PM
Potassium	2.91	0.100	0.300		mg/L	1	05/22/19 03:09 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:09 PM
Sodium	173	2.00	6.00		mg/L	20	05/23/19 11:36 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 03:09 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 09:58 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	20.0	0.300	1.00		mg/L	1	05/16/19 08:09 PM
Fluoride	0.229	0.100	0.400	J	mg/L	1	05/16/19 08:09 PM
Nitrate-N	0.324	0.100	0.500	J	mg/L	1	05/16/19 08:09 PM
Sulfate	89.9	1.00	3.00		mg/L	1	05/16/19 08:09 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	285	10.0	20.0		mg/L @ pH 4.52	1	05/17/19 04:24 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/17/19 04:24 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/17/19 04:24 PM
Alkalinity, Total (As CaCO3)	285	20.0	20.0		mg/L @ pH 4.52	1	05/17/19 04:24 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.0676	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 04:02 PM

Qualifiers:

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

CLIENT:	Golder	**Client Sample ID:**	BMW-18
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-09
Project No:	19122262-D	**Collection Date:**	05/15/19 02:10 PM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.140	0.0300	0.100		mg/L	1	05/16/19 02:50 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	473	10.0	10.0		mg/L	1	05/20/19 04:45 PM

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-28
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-10
Project No:	19122262-D	**Collection Date:**	05/15/19 03:00 PM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:11 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:11 PM
Barium	0.0285	0.00300	0.0100		mg/L	1	05/22/19 03:11 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:11 PM
Boron	1.01	0.0100	0.0300		mg/L	1	05/22/19 03:11 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:11 PM
Calcium	249	5.00	15.0		mg/L	50	05/23/19 11:38 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:11 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 03:11 PM
Iron	0.0633	0.0300	0.100	J	mg/L	1	05/22/19 03:11 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:11 PM
Lithium	0.119	0.00500	0.0100		mg/L	1	05/22/19 03:11 PM
Magnesium	163	5.00	15.0		mg/L	50	05/23/19 11:38 AM
Molybdenum	0.0124	0.00200	0.00500		mg/L	1	05/22/19 03:11 PM
Potassium	18.6	0.100	0.300		mg/L	1	05/22/19 03:11 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:11 PM
Sodium	652	5.00	15.0		mg/L	50	05/23/19 11:38 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 03:11 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 10:04 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	133	3.00	10.0		mg/L	10	05/17/19 03:37 AM
Fluoride	0.496	0.100	0.400		mg/L	1	05/16/19 08:25 PM
Nitrate-N	0.493	0.100	0.500	J	mg/L	1	05/16/19 08:25 PM
Sulfate	1820	100	300		mg/L	100	05/17/19 04:25 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	751	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 04:49 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 04:49 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 04:49 PM
Alkalinity, Total (As CaCO3)	751	20.0	20.0		mg/L @ pH 4.54	1	05/17/19 04:49 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.0633	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 04:02 PM

Qualifiers:

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-28
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-10
Project No:	19122262-D	**Collection Date:**	05/15/19 03:00 PM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.0370	0.0300	0.100	J	mg/L	1	05/16/19 02:50 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3610	50.0	50.0		mg/L	1	05/20/19 04:45 PM

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-20
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-11
Project No:	19122262-D	**Collection Date:**	05/15/19 04:00 PM
Lab Order:	1905185	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:50 PM
Arsenic	0.00541	0.00200	0.00500		mg/L	1	05/22/19 03:50 PM
Barium	0.0412	0.00300	0.0100		mg/L	1	05/22/19 03:50 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:50 PM
Boron	0.979	0.0100	0.0300		mg/L	1	05/22/19 03:50 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:50 PM
Calcium	146	2.00	6.00		mg/L	20	05/23/19 11:53 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:50 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 03:50 PM
Iron	1.28	0.0300	0.100		mg/L	1	05/22/19 03:50 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:50 PM
Lithium	0.0615	0.00500	0.0100		mg/L	1	05/22/19 03:50 PM
Magnesium	136	2.00	6.00		mg/L	20	05/23/19 11:53 AM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:50 PM
Potassium	5.21	0.100	0.300		mg/L	1	05/22/19 03:50 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:50 PM
Sodium	382	2.00	6.00		mg/L	20	05/23/19 11:53 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 03:50 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 10:07 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	426	3.00	10.0		mg/L	10	05/17/19 04:57 AM
Fluoride	0.418	0.100	0.400		mg/L	1	05/16/19 10:01 PM
Nitrate-N	0.595	0.100	0.500		mg/L	1	05/16/19 10:01 PM
Sulfate	474	10.0	30.0		mg/L	10	05/17/19 04:57 AM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	773	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 05:15 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 05:15 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/17/19 05:15 PM
Alkalinity, Total (As CaCO3)	773	20.0	20.0		mg/L @ pH 4.54	1	05/17/19 05:15 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	1.28	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 04:02 PM

Qualifiers:

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

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-20
Project:	Luminant-A1 Landfill	**Lab ID:**	1905185-11
Project No:	19122262-D	**Collection Date:**	05/15/19 04:00 PM
Lab Order:	1905185	**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	05/16/19 02:52 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2030	50.0	50.0		mg/L	1	05/20/19 04:45 PM

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

CLIENT: Golder
Work Order: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_190524A

The QC data in batch 91059 applies to the following samples: 1905185-01B, 1905185-02B, 1905185-03B, 1905185-04B, 1905185-05B, 1905185-06B, 1905185-07B, 1905185-08B, 1905185-09B, 1905185-10B, 1905185-11B

Sample ID	**MB-91059**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 9:28:33 AM**	Prep Date:	**5/23/2019**

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

Sample ID	**LCS-91059**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 9:33:05 AM**	Prep Date:	**5/23/2019**

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-91059**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 9:35:22 AM**	Prep Date:	**5/23/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00195	0.000200	0.00200	0	97.5	85	115	4.19	15	

Sample ID	**1905231-01A MS**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 10:20:46 AM**	Prep Date:	**5/23/2019**

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			

Sample ID	**1905231-01A MSD**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 10:23:02 AM**	Prep Date:	**5/23/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00925	0.00100	0.0100	0	92.5	80	120	3.71	15	

Sample ID	**1905231-01A SD**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 10:25:18 AM**	Prep Date:	**5/23/2019**

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

Sample ID	**1905231-01A PDS**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 10:27:34 AM**	Prep Date:	**5/23/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0120	0.00100	0.0125	0	95.6	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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_190524A

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

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

Sample ID	**CCV1-190524**	Batch ID:	**R104261**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 10:00:18 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00214	0.000200	0.00200	0	107	90	110			

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

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

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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

The QC data in batch 90989 applies to the following samples: 1905185-01B, 1905185-02B, 1905185-03B, 1905185-04B, 1905185-05B, 1905185-06B, 1905185-07B, 1905185-08B, 1905185-09B, 1905185-10B, 1905185-11B

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

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

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

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

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

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

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

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

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

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

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

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

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

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

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

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

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

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

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

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

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

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

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

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

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

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

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

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190523A

The QC data in batch 90989 applies to the following samples: 1905185-01B, 1905185-02B, 1905185-03B, 1905185-04B, 1905185-05B, 1905185-06B, 1905185-07B, 1905185-08B, 1905185-09B, 1905185-10B, 1905185-11B

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

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

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190523A

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

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.104	0.0300	0.100	0	104	90	110			
Calcium	2.39	0.300	2.50	0	95.8	90	110			
Iron	2.56	0.100	2.50	0	102	90	110			
Magnesium	2.53	0.300	2.50	0	101	90	110			
Sodium	2.56	0.300	2.50	0	102	90	110			

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

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0214	0.0300	0.0200	0	107	70	130			
Calcium	0.0901	0.300	0.100	0	90.1	70	130			
Iron	0.105	0.100	0.100	0	105	70	130			
Magnesium	0.0985	0.300	0.100	0	98.5	70	130			
Sodium	0.0949	0.300	0.100	0	94.9	70	130			

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

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.210	0.0300	0.200	0	105	90	110			
Calcium	4.76	0.300	5.00	0	95.2	90	110			
Iron	5.10	0.100	5.00	0	102	90	110			
Magnesium	5.21	0.300	5.00	0	104	90	110			
Sodium	5.14	0.300	5.00	0	103	90	110			

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

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0248	0.0300	0.0200	0	124	70	130			
Calcium	0.0899	0.300	0.100	0	89.9	70	130			
Iron	0.105	0.100	0.100	0	105	70	130			
Magnesium	0.0985	0.300	0.100	0	98.5	70	130			
Sodium	0.0973	0.300	0.100	0	97.3	70	130			

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

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.79	0.300	5.00	0	95.7	90	110			

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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190523A

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

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	5.29	0.300	5.00	0	106	90	110			
Sodium	5.22	0.300	5.00	0	104	90	110			

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190516B

The QC data in batch 90934 applies to the following samples: 1905185-01C, 1905185-02C, 1905185-03C, 1905185-04C, 1905185-05C, 1905185-06C, 1905185-07C, 1905185-08C, 1905185-09C, 1905185-10C, 1905185-11C

Sample ID **MB-90934** Batch ID: **90934** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_190516B** Analysis Date: **5/16/2019 10:26:41 AM** Prep Date: **5/16/2019**

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-90934** Batch ID: **90934** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_190516B** Analysis Date: **5/16/2019 10:42:42 AM** Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Fluoride	4.08	0.400	4.000	0	102	90	110			
Nitrate-N	5.10	0.500	5.000	0	102	90	110			
Sulfate	30.6	3.00	30.00	0	102	90	110			

Sample ID **LCSD-90934** Batch ID: **90934** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_190516B** Analysis Date: **5/16/2019 10:58:41 AM** Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110	0.034	20	
Fluoride	4.08	0.400	4.000	0	102	90	110	0.128	20	
Nitrate-N	5.18	0.500	5.000	0	104	90	110	1.47	20	
Sulfate	30.8	3.00	30.00	0	103	90	110	0.343	20	

Sample ID **1905178-02DMS** Batch ID: **90934** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_190516B** Analysis Date: **5/16/2019 12:59:35 PM** Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	21400	1000	20000	0	107	90	110			
Fluoride	21400	400	20000	0	107	90	110			
Nitrate-N	4620	500	4516	0	102	90	110			
Sulfate	20700	3000	20000	0	103	90	110			

Sample ID **1905178-02DMSD** Batch ID: **90934** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_190516B** Analysis Date: **5/16/2019 1:15:35 PM** Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	21000	1000	20000	0	105	90	110	2.04	20	
Fluoride	21000	400	20000	0	105	90	110	1.92	20	
Nitrate-N	4530	500	4516	0	100	90	110	2.06	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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190516B

Sample ID **1905178-02DMSD**	Batch ID: **90934**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_190516B**	Analysis Date: **5/16/2019 1:15:35 PM**	Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	20200	3000	20000	0	101	90	110	2.16	20	

Sample ID **1905178-03DMS**	Batch ID: **90934**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_190516B**	Analysis Date: **5/16/2019 1:47:35 PM**	Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24300	1000	20000	3227	105	90	110			
Fluoride	21100	400	20000	0	106	90	110			
Nitrate-N	4600	500	4516	0	102	90	110			
Sulfate	20400	3000	20000	0	102	90	110			

Sample ID **1905178-03DMSD**	Batch ID: **90934**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_190516B**	Analysis Date: **5/16/2019 2:03:35 PM**	Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24200	1000	20000	3227	105	90	110	0.381	20	
Fluoride	21100	400	20000	0	106	90	110	0.221	20	
Nitrate-N	4550	500	4516	0	101	90	110	1.04	20	
Sulfate	20100	3000	20000	0	101	90	110	1.20	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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190516B

Sample ID **ICV-190516**	Batch ID: **R104123**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_190516B**	Analysis Date: **5/16/2019 9:54:41 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	10.5	0.400	10.00	0	105	90	110			
Nitrate-N	13.3	0.500	12.50	0	106	90	110			
Sulfate	78.9	3.00	75.00	0	105	90	110			

Sample ID **CCV1-190516**	Batch ID: **R104123**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190516B**	Analysis Date: **5/16/2019 5:29:14 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.5	1.00	10.00	0	105	90	110			
Fluoride	4.18	0.400	4.000	0	104	90	110			
Nitrate-N	5.22	0.500	5.000	0	104	90	110			
Sulfate	31.5	3.00	30.00	0	105	90	110			

Sample ID **CCV2-190516**	Batch ID: **R104123**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190516B**	Analysis Date: **5/16/2019 9:29:14 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.5	1.00	10.00	0	105	90	110			
Fluoride	4.18	0.400	4.000	0	105	90	110			
Nitrate-N	5.22	0.500	5.000	0	104	90	110			
Sulfate	31.9	3.00	30.00	0	106	90	110			

Sample ID **CCV3-190516**	Batch ID: **R104123**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190516B**	Analysis Date: **5/17/2019 12:41:14 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.8	1.00	10.00	0	108	90	110			
Fluoride	4.24	0.400	4.000	0	106	90	110			
Nitrate-N	5.27	0.500	5.000	0	105	90	110			
Sulfate	31.9	3.00	30.00	0	106	90	110			

Sample ID **CCV4-190516**	Batch ID: **R104123**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190516B**	Analysis Date: **5/17/2019 4:25:14 AM**	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			
Sulfate	31.6	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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190516B

Sample ID **CCV5-190516**	Batch ID: **R104123**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190516B**	Analysis Date: **5/17/2019 6:49:14 AM**	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			
Sulfate	31.8	3.00	30.00	0	106	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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190517B

The QC data in batch 90964 applies to the following samples: 1905185-08C, 1905185-10C

Sample ID	**MB-90964**	Batch ID:	**90964**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_190517B**	Analysis Date:	**5/17/2019 10:29:03 AM**	Prep Date:	**5/17/2019**

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

Sample ID	**LCS-90964**	Batch ID:	**90964**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_190517B**	Analysis Date:	**5/17/2019 10:45:03 AM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	31.5	3.00	30.00	0	105	90	110			

Sample ID	**LCSD-90964**	Batch ID:	**90964**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_190517B**	Analysis Date:	**5/17/2019 11:01:03 AM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	31.6	3.00	30.00	0	105	90	110	0.320	20	

Sample ID	**1905169-06BMS**	Batch ID:	**90964**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190517B**	Analysis Date:	**5/17/2019 3:37:12 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	388	30.0	200.0	177.5	105	90	110			

Sample ID	**1905169-06BMSD**	Batch ID:	**90964**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190517B**	Analysis Date:	**5/17/2019 3:53:11 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	394	30.0	200.0	177.5	108	90	110	1.58	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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190517B

Sample ID **ICV-190517**	Batch ID: **R104148**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_190517B**	Analysis Date: **5/17/2019 9:57:03 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	80.5	3.00	75.00	0	107	90	110			

Sample ID **CCV1-190517**	Batch ID: **R104148**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190517B**	Analysis Date: **5/17/2019 7:21:11 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	31.9	3.00	30.00	0	106	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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190517A

The QC data in batch 90967 applies to the following samples: 1905185-01C, 1905185-02C, 1905185-03C, 1905185-04C, 1905185-05C, 1905185-06C, 1905185-07C, 1905185-08C, 1905185-09C, 1905185-10C, 1905185-11C

Sample ID **MB-90967** Batch ID: **90967** TestNo: **M2320 B** Units: **mg/L @ pH 4.18**
SampType: **MBLK** Run ID: **TITRATOR_190517A** Analysis Date: **5/17/2019 10:37:00 AM** Prep Date: **5/17/2019**

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-90967** Batch ID: **90967** TestNo: **M2320 B** Units: **mg/L @ pH 4.07**
SampType: **LCS** Run ID: **TITRATOR_190517A** Analysis Date: **5/17/2019 10:42:00 AM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	52.8	20.0	50.00	0	106	74	129			

Sample ID **LCSD-90967** Batch ID: **90967** TestNo: **M2320 B** Units: **mg/L @ pH 4.09**
SampType: **LCSD** Run ID: **TITRATOR_190517A** Analysis Date: **5/17/2019 11:23:00 AM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	52.7	20.0	50.00	0	105	74	129	0.152	20	

Sample ID **1905178-02D DUP** Batch ID: **90967** TestNo: **M2320 B** Units: **mg/L @ pH 4.53**
SampType: **DUP** Run ID: **TITRATOR_190517A** Analysis Date: **5/17/2019 12:39:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	460	20.0	0	469.5				2.04	20	
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	460	20.0	0	469.5				2.04	20	

Sample ID **1905185-03C DUP** Batch ID: **90967** TestNo: **M2320 B** Units: **mg/L @ pH 4.54**
SampType: **DUP** Run ID: **TITRATOR_190517A** Analysis Date: **5/17/2019 2:20:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	469	20.0	0	473.7				1.06	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)	469	20.0	0	473.7				1.06	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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190517A

Sample ID **ICV-190517**	Batch ID: **R104143**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.21**
SampType: **ICV**	Run ID: **TITRATOR_190517A**	Analysis Date: **5/17/2019 10:16:00 AM**	Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	10.2	20.0	0							
Alkalinity, Carbonate (As CaCO3)	88.2	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	98.3	20.0	100.0	0	98.3	98	102			

Sample ID **CCV1-190517**	Batch ID: **R104143**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.25**
SampType: **CCV**	Run ID: **TITRATOR_190517A**	Analysis Date: **5/17/2019 1:41:00 PM**	Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	25.5	20.0	0							
Alkalinity, Carbonate (As CaCO3)	73.1	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	98.6	20.0	100.0	0	98.6	90	110			

Sample ID **CCV2-190517**	Batch ID: **R104143**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.22**
SampType: **CCV**	Run ID: **TITRATOR_190517A**	Analysis Date: **5/17/2019 5:20:00 PM**	Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	14.9	20.0	0							
Alkalinity, Carbonate (As CaCO3)	84.2	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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190516B

The QC data in batch 90950 applies to the following samples: 1905185-01C, 1905185-02C, 1905185-03C, 1905185-04C, 1905185-05C, 1905185-06C, 1905185-07C, 1905185-08C, 1905185-09C, 1905185-10C, 1905185-11C

Sample ID	**MB-90950**	Batch ID:	**90950**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**UV/VIS_2_190516B**	Analysis Date:	**5/16/2019 2:45:00 PM**	Prep Date:	**5/16/2019**

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

Sample ID	**LCS-90950**	Batch ID:	**90950**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**UV/VIS_2_190516B**	Analysis Date:	**5/16/2019 2:45:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.523	0.100	0.5000	0	105	80	120			

Sample ID	**LCSD-90950**	Batch ID:	**90950**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**UV/VIS_2_190516B**	Analysis Date:	**5/16/2019 2:46:00 PM**	Prep Date:	**5/16/2019**

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	5.30	15	

Sample ID	**1905185-01CMS**	Batch ID:	**90950**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**UV/VIS_2_190516B**	Analysis Date:	**5/16/2019 2:46:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.647	0.100	0.5000	0.05100	119	80	120			

Sample ID	**1905185-01CMSD**	Batch ID:	**90950**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**UV/VIS_2_190516B**	Analysis Date:	**5/16/2019 2:47:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.614	0.100	0.5000	0.05100	113	80	120	5.23	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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190516B

Sample ID **ICV-190516**	Batch ID: **R104109**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_190516B**	Analysis Date: **5/16/2019 2:44:00 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 **CCV1-190516**	Batch ID: **R104109**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190516B**	Analysis Date: **5/16/2019 2:51:00 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			

Sample ID **CCV2-190516**	Batch ID: **R104109**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190516B**	Analysis Date: **5/16/2019 2:53:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.485	0.100	0.5000	0	97.0	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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190520A

The QC data in batch 91002 applies to the following samples: 1905185-01A, 1905185-02A, 1905185-03A, 1905185-04A, 1905185-05A, 1905185-06A, 1905185-07A, 1905185-08A, 1905185-09A, 1905185-10A, 1905185-11A

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: 1905185
Project: Luminant-A1 Landfill

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: 1905185
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: WC_190520A

The QC data in batch 91001 applies to the following samples: 1905185-01C, 1905185-02C, 1905185-03C, 1905185-04C, 1905185-05C, 1905185-06C, 1905185-07C, 1905185-08C, 1905185-09C, 1905185-10C, 1905185-11C

Sample ID	**MB-91001**	Batch ID:	**91001**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_190520A**	Analysis Date:	**5/20/2019 4:45:00 PM**	Prep Date:	**5/20/2019**

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-91001**	Batch ID:	**91001**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_190520A**	Analysis Date:	**5/20/2019 4:45:00 PM**	Prep Date:	**5/20/2019**

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	**1905182-01D-DUP**	Batch ID:	**91001**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190520A**	Analysis Date:	**5/20/2019 4:45:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	6840	200	0	6820				0.293	5	

Sample ID	**1905182-02D-DUP**	Batch ID:	**91001**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190520A**	Analysis Date:	**5/20/2019 4:45:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	5030	50.0	0	5065				0.693	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 18, 2019

DHL Analytical, Inc.

Sample Delivery Group:	L1100977
Samples Received:	05/21/2019
Project Number:	1905185
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.

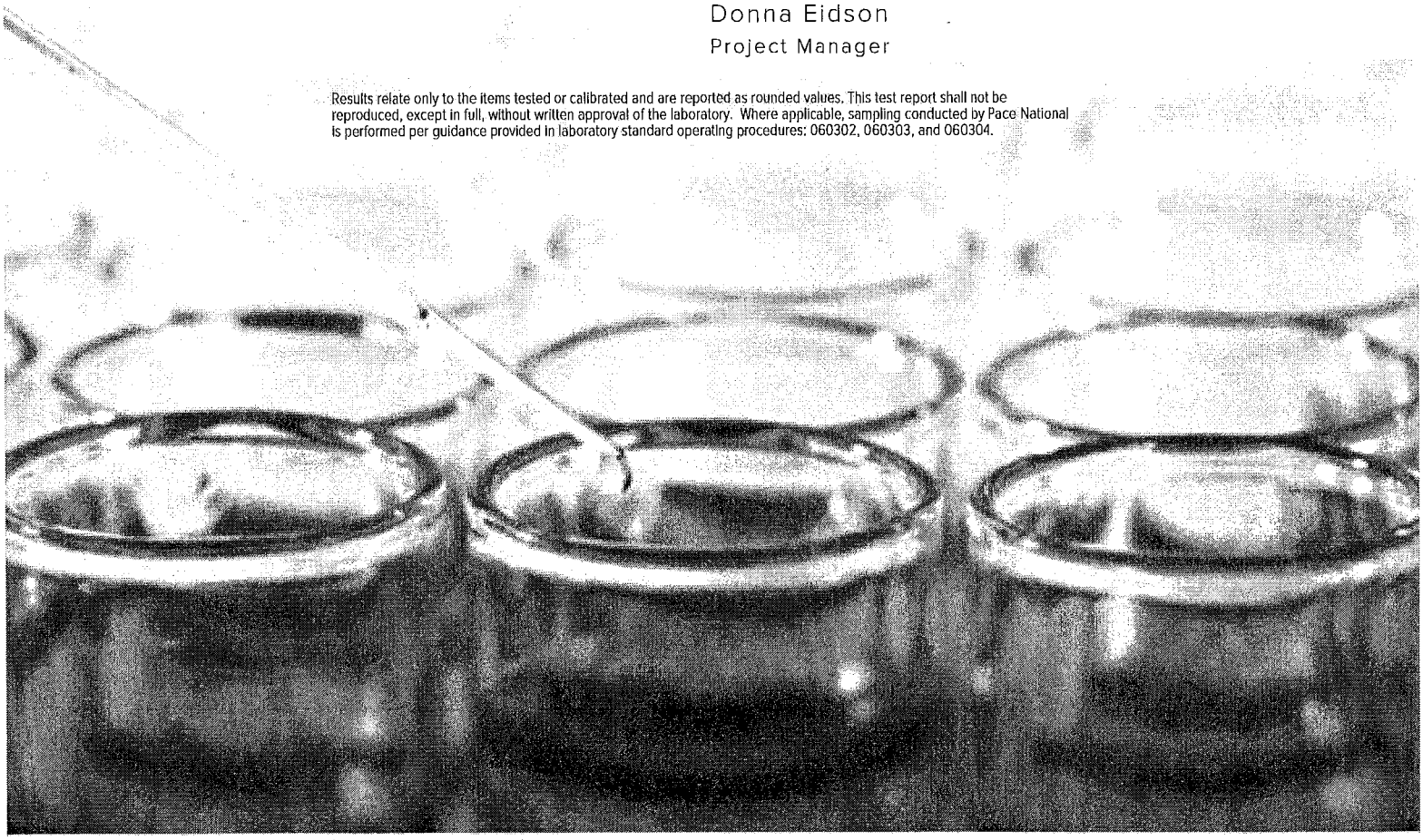


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BMW-24 L1100977-01 Non-Potable Water

Collected by | Collected date/time 05/15/19 07:35 | Received date/time 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	05/30/19 12:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1285448	1	05/28/19 16:20	05/30/19 13:00	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1285448	1	05/28/19 16:20	05/30/19 13:00	RGT	Mt. Juliet, TN

BMW-23 L1100977-02 Non-Potable Water

Collected by | Collected date/time 05/15/19 08:25 | Received date/time 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	06/13/19 16:05	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1285448	1	05/28/19 16:20	06/13/19 16:05	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1285448	1	05/28/19 16:20	05/30/19 13:00	RGT	Mt. Juliet, TN

BMW-22 L1100977-03 Non-Potable Water

Collected by | Collected date/time 05/15/19 09:15 | Received date/time 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	05/30/19 12:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1285448	1	05/28/19 16:20	05/30/19 13:00	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1285448	1	05/28/19 16:20	05/30/19 13:00	RGT	Mt. Juliet, TN

BMW-21 L1100977-04 Non-Potable Water

Collected by | Collected date/time 05/15/19 09:55 | Received date/time 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	05/30/19 12:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1285448	1	05/28/19 16:20	05/30/19 13:00	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1285448	1	05/28/19 16:20	05/30/19 13:00	RGT	Mt. Juliet, TN

BMW-27 L1100977-05 Non-Potable Water

Collected by | Collected date/time 05/15/19 10:55 | Received date/time 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	05/30/19 12:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1285448	1	05/28/19 16:20	05/30/19 17:30	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1285448	1	05/28/19 16:20	05/30/19 17:30	RGT	Mt. Juliet, TN

BMW-26 L1100977-06 Non-Potable Water

Collected by | Collected date/time 05/15/19 11:40 | Received date/time 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	05/30/19 12:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1285448	1	05/28/19 16:20	05/30/19 17:30	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1285448	1	05/28/19 16:20	05/30/19 17:30	RGT	Mt. Juliet, TN

BMW-11AR L1100977-07 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/15/19 12:35	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	05/30/19 12:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1285448	1	05/28/19 16:20	05/30/19 17:30	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1285448	1	05/28/19 16:20	05/30/19 17:30	RGT	Mt. Juliet, TN

BMW-19 L1100977-08 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/15/19 13:25	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	05/30/19 12:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1285448	1	05/28/19 16:20	05/30/19 17:30	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1285448	1	05/28/19 16:20	05/30/19 17:30	RGT	Mt. Juliet, TN

BMW-18 L1100977-09 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/15/19 14:10	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	05/30/19 12:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1285448	1	05/28/19 16:20	05/30/19 17:30	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1285448	1	05/28/19 16:20	05/30/19 17:30	RGT	Mt. Juliet, TN

BMW-28 L1100977-10 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/15/19 15:00	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	WG1285448	1	05/28/19 16:20	05/31/19 11:10	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1285448	1	05/28/19 16:20	05/30/19 17:30	RGT	Mt. Juliet, TN

BMW-20 L1100977-11 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/15/19 16:00	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	WG1285448	1	05/28/19 16:20	05/31/19 11:10	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1285448	1	05/28/19 16:20	05/30/19 17:30	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	-0.0695		0.728	1.21	05/30/2019 12:10	WG1285651
(T) Barium	*109*			*62.0-143*	*05/30/2019 12:10*	WG1285651
(T) Yttrium	*113*			*79.0-136*	*05/30/2019 12:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	1.45		1.23	1.48	05/30/2019 13:00	WG1285448

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	1.45		0.499	0.265	05/30/2019 13:00	WG1285448
(T) Barium-133	*80.0*			*30.0-143*	*05/30/2019 13:00*	WG1285448

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	1.00		0.384	0.82	06/13/2019 16:05	WG1285651
(T) Barium	*88.9*			*62.0-143*	*06/13/2019 16:05*	WG1285651
(T) Yttrium	*104*			*79.0-136*	*06/13/2019 16:05*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	3.54		1.14	1.55	06/13/2019 16:05	WG1285448

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	2.54		0.757	0.731	05/30/2019 13:00	WG1285448
(T) Barium-133	*89.6*			*30.0-143*	*05/30/2019 13:00*	WG1285448

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	1.64		0.361	0.547	05/30/2019 12:10	WG1285651
(T) Barium	*112*			*62.0-143*	*05/30/2019 12:10*	WG1285651
(T) Yttrium	*113*			*79.0-136*	*05/30/2019 12:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	5.00		1.19	0.945	05/30/2019 13:00	WG1285448

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	3.36		0.831	0.398	05/30/2019 13:00	WG1285448
(T) Barium-133	*79.4*			*30.0-143*	*05/30/2019 13:00*	WG1285448

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	1.07		0.398	0.586	05/30/2019 12:10	WG1285651
(T) Barium	*108*			*62.0-143*	*05/30/2019 12:10*	WG1285651
(T) Yttrium	*120*			*79.0-136*	*05/30/2019 12:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	1.31		0.656	0.908	05/30/2019 13:00	WG1285448

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.245		0.258	0.322	05/30/2019 13:00	WG1285448
(T) Barium-133	*73.1*			*30.0-143*	*05/30/2019 13:00*	WG1285448

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	0.962		0.387	0.609	05/30/2019 12:10	WG1285651
(T) Barium	*112*			*62.0-143*	*05/30/2019 12:10*	WG1285651
(T) Yttrium	*115*			*79.0-136*	*05/30/2019 12:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	1.02		0.499	0.804	05/30/2019 17:30	WG1285448

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	0.0591		0.112	0.195	05/30/2019 17:30	WG1285448
(T) Barium-133	*90.6*			*30.0-143*	*05/30/2019 17:30*	WG1285448

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	1.13		0.329	0.524	05/30/2019 12:10	WG1285651
(T) Barium	*114*			*62.0-143*	*05/30/2019 12:10*	WG1285651
(T) Yttrium	*120*			*79.0-136*	*05/30/2019 12:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	1.59		0.595	0.737	05/30/2019 17:30	WG1285448

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.457		0.266	0.213	05/30/2019 17:30	WG1285448
(T) Barium-133	*86.2*			*30.0-143*	*05/30/2019 17:30*	WG1285448

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	4.89		0.423	0.671	05/30/2019 12:10	WG1285651
(T) Barium	*103*			*62.0-143*	*05/30/2019 12:10*	WG1285651
(T) Yttrium	*116*			*79.0-136*	*05/30/2019 12:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	5.71		0.795	0.964	05/30/2019 17:30	WG1285448

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.830		0.372	0.293	05/30/2019 17:30	WG1285448
(T) Barium-133	*87.9*			*30.0-143*	*05/30/2019 17:30*	WG1285448

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	4.66		0.515	0.78	05/30/2019 12:10	WG1285651
(T) Barium	*99.1*			*62.0-143*	*05/30/2019 12:10*	WG1285651
(T) Yttrium	*118*			*79.0-136*	*05/30/2019 12:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	5.47		1.05	1.23	05/30/2019 17:30	WG1285448

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.487		0.321	0.268	05/30/2019 17:30	WG1285448
(T) Barium-133	*71.8*			*30.0-143*	*05/30/2019 17:30*	WG1285448

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	3.95		0.414	0.603	05/30/2019 12:10	WG1285651
(T) Barium	*96.9*			*62.0-143*	*05/30/2019 12:10*	WG1285651
(T) Yttrium	*118*			*79.0-136*	*05/30/2019 12:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	4.06		0.584	0.867	05/30/2019 17:30	WG1285448

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.107		0.170	0.264	05/30/2019 17:30	WG1285448
(T) Barium-133	*84.7*			*30.0-143*	*05/30/2019 17:30*	WG1285448

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.924		0.410	0.59	05/31/2019 11:10	WG1285651
(T) Barium	*122*			*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	1.12		0.635	0.879	05/31/2019 11:10	WG1285448

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.197		0.225	0.289	05/30/2019 17:30	WG1285448
(T) Barium-133	*55.5*			*30.0-143*	*05/30/2019 17:30*	WG1285448

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	0.174		0.384	0.657	05/31/2019 11:10	WG1285651
(T) Barium	*85.3*			*62.0-143*	*05/31/2019 11:10*	WG1285651
(T) Yttrium	*108*			*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	1.36		0.877	1.01	05/31/2019 11:10	WG1285448

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	1.18		0.493	0.349	05/30/2019 17:30	WG1285448
(T) Barium-133	*73.8*			*30.0-143*	*05/30/2019 17:30*	WG1285448

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) R3418748-1 05/30/19 13:00

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-226	0.0330		0.399
(T) Barium-133	*58.0*		

L1102014-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1102014-01 05/30/19 17:30 • (DUP) R3418748-5 05/30/19 13:00

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.955	0.488	1	64.8	0.623		20	3
(T) Barium-133	*41.0*	*37.0*						

Laboratory Control Sample (LCS)

(LCS) R3418748-2 05/30/19 13:00

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	20.1	19.8	98.4	80.0-120	
(T) Barium-133			*57.4*		

L1102014-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1102014-02 05/30/19 17:30 • (MS) R3418748-3 05/30/19 13:00 • (MSD) R3418748-4 05/30/19 13:00

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	0.487	22.6	23.9	110	116	1	75.0-125			5.68		20
(T) Barium-133		*59.1*			*47.0*	*45.7*							

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

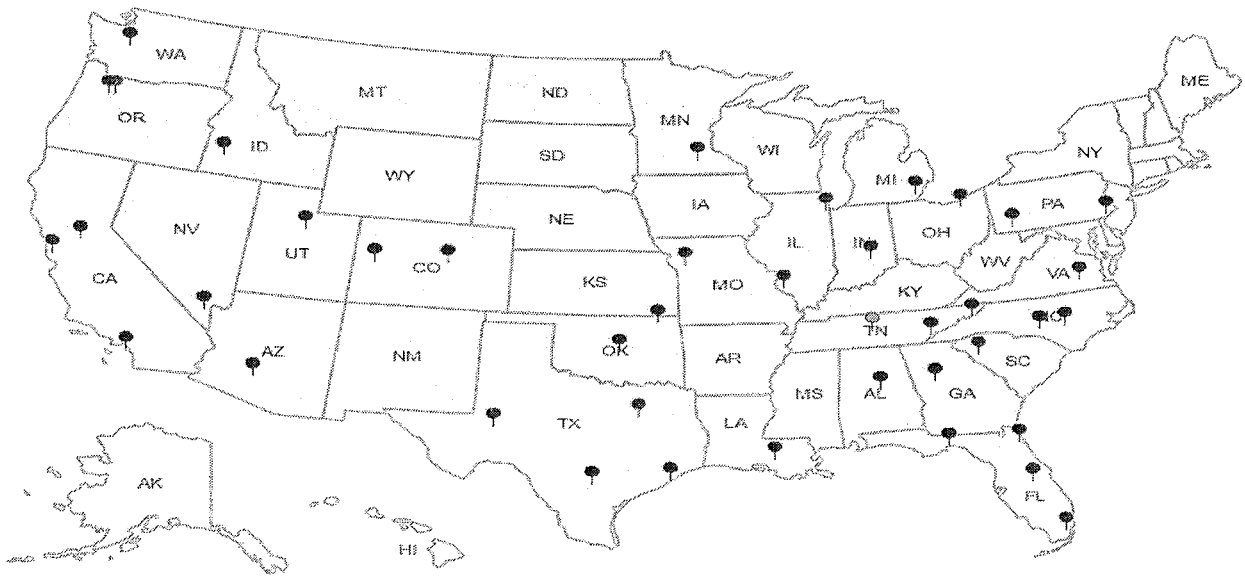
Third Party Federal Accreditations

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: DHCRTX		SDG#:	1100977
Cooler Received/Opened On: 5/21/19		Temperature:	Amb
Received By: Brock Fariss			
Signature: BF Fariss			

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

Pace Analytical®
National Center for Testing & Innovation

Login #:L1100977	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
	pH not in range.		Please specify TCLP requested.		Improper handling by carrier (FedEx / UPS / Courier
	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:
Sample BMW-23,-22,-11AR, and -19 were received ith a pH oh 5
Samples BMW- 21,-27,-26,-28,-20 were received with a pH pf 8

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

Login Instructions:

Noted

DE 5/21/19 1547

1100977

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

CHAIN-OF-CUSTODY RECORD

H006

Work Order: 1905185

Subcontractor:

Pace Analytical
12065 Lebanon Rd
Mt. Juliet, TN 37122

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

c2 c2

16-May-19

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Ra-228 E904.0	Ra-226 M7500 Ra B M	Requested Tests			
BMW-24	Aqueous	-01D	05/15/19 07:35 AM	1LHDPEHNO3		1				-01
BMW-24	Aqueous	-01E	05/15/19 07:35 AM	1LHDPEHNO3	1					
BMW-23	Aqueous	-02D	05/15/19 08:25 AM	1LHDPEHNO3		1				02
BMW-23	Aqueous	-02E	05/15/19 08:25 AM	1LHDPEHNO3	1					
BMW-22	Aqueous	-03D	05/15/19 09:15 AM	1LHDPEHNO3		1				03
BMW-22	Aqueous	-03E	05/15/19 09:15 AM	1LHDPEHNO3	1					
BMW-21	Aqueous	-04D	05/15/19 09:55 AM	1LHDPEHNO3		1				04
BMW-21	Aqueous	-04E	05/15/19 09:55 AM	1LHDPEHNO3	1					
BMW-27	Aqueous	-05D	05/15/19 10:55 AM	1LHDPEHNO3		1				05
BMW-27	Aqueous	-05E	05/15/19 10:55 AM	1LHDPEHNO3	1					
BMW-26	Aqueous	-06D	05/15/19 11:40 AM	1LHDPEHNO3		1				06
BMW-26	Aqueous	-06E	05/15/19 11:40 AM	1LHDPEHNO3	1					
BMW-11AR	Aqueous	-07D	05/15/19 12:35 PM	1LHDPEHNO3		1				07
BMW-11AR	Aqueous	-07E	05/15/19 12:35 PM	1LHDPEHNO3	1					
BMW-19	Aqueous	-08D	05/15/19 01:25 PM	1LHDPEHNO3		1				08
BMW-19	Aqueous	-08E	05/15/19 01:25 PM	1LHDPEHNO3	1					
BMW-18	Aqueous	-09D	05/15/19 02:10 PM	1LHDPEHNO3		1				09
BMW-18	Aqueous	-09E	05/15/19 02:10 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: 22

	Date/Time		Date/Time
Relinquished by:	5/17/19 1700	Received by:	5/21/19 0815/1010
Relinquished by:		Received by:	

pH adj @ 1457

Area RAD SCREEN: <0.5 mR/hr

1100977

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

CHAIN-OF-CUSTODY RECORD

Work Order: 1905185

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

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

< 2 < 2

16-May-19

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Ra-228 E904.0	Ra-226 M7500 Ra B M	Requested Tests			
BMW-28	Aqueous	-10D	05/15/19 03:00 PM	1LHDPEHNO3		1				10
BMW-28	Aqueous	-10E	05/15/19 03:00 PM	1LHDPEHNO3	1					
BMW-20	Aqueous	-11D	05/15/19 04:00 PM	1LHDPEHNO3		1				11
BMW-20	Aqueous	-11E	05/15/19 04:00 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: 22

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

Amb

RAD SCREEN: <0.5 mR/hr

June 21, 2019

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

Order No.: 1906152

RE: A1 Area Landfill

Dear Will Vienne:

DHL Analytical, Inc. received 6 sample(s) on 6/14/2019 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

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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

№ 83013

CHAIN-OF-CUSTODY

CLIENT: Golder Associates
ADDRESS: 5416 Plaza Dr Texarkana TX 75501
PHONE: 903-794-0625 FAX/E-MAIL:
DATA REPORTED TO:
ADDITIONAL REPORT COPIES TO:

DATE: PAGE 1 OF 1
PO #: 9122434-D DHL WORK ORDER #: 1906152
PROJECT LOCATION OR NAME: AI Area Landfill
CLENT PROJECT #: 9122434-D COLLECTOR: Alex Gonzales

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 ☐ COD ☐ | CHLORIDE ☐ ANIONS ☐ | TCLP-SVOC ☐ VOC ☐ PEST ☐ HERB ☐ | TCLP-METALS ☐ RCRA 8 ☐ TX-11 ☐ Pb ☐ | RCI ☐ FLASHPOINT ☐ DGAS ☐ | TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐ | Cobalt, Sulfate, Lithium | Lithium, Sulfate | Barium | Arsenic | Alk, NO3, P, SO4, Cl, ortho-P, TDS | Mg, K, Na, Fe | Ferrous, Ferric | FIELD NOTES

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES	FIELD NOTES
BMW-25	01	6/13	0930	W		7		X		X	X	Cobalt, Sulfate, Lithium; Barium; Arsenic; Alk, NO3, P, SO4, Cl, ortho-P, TDS; Mg, K, Na, Fe; Ferrous, Ferric	
BMW-29	02	6/13	1030	W		7		X		X	X	Lithium, Sulfate; Barium; Arsenic; Alk, NO3, P, SO4, Cl, ortho-P, TDS; Mg, K, Na, Fe; Ferrous, Ferric	
BMW-30	03	6/13	1250	W		7		X		X	X	Barium; Arsenic; Alk, NO3, P, SO4, Cl, ortho-P, TDS; Mg, K, Na, Fe; Ferrous, Ferric	
BMW-31	04	6/13	1430	W		7		X		X	X	Lithium, Sulfate; Barium; Arsenic; Alk, NO3, P, SO4, Cl, ortho-P, TDS; Mg, K, Na, Fe; Ferrous, Ferric	
BMW-32	05	6/13	0730	W		7		X		X	X	Cobalt, Sulfate, Lithium; Barium; Arsenic; Alk, NO3, P, SO4, Cl, ortho-P, TDS; Mg, K, Na, Fe; Ferrous, Ferric	
BMW-33	06	6/13	0815	W		7		X		X	X	Cobalt, Sulfate, Lithium; Barium; Arsenic; Alk, NO3, P, SO4, Cl, ortho-P, TDS; Mg, K, Na, Fe; Ferrous, Ferric	add per Will Vienne (JO) 06/14/19

RELINQUISHED BY: (Signature) Alex Gonzales DATE/TIME 6/13/19 1730 RECEIVED BY: (Signature) FedEx
RELINQUISHED BY: (Signature) FedEx DATE/TIME 6/14/19 10:08 RECEIVED BY: (Signature) Sam Lehm
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

☐ DHL DISPOSAL @ $5.00 each ☐ Return

3

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

LABORATORY USE ONLY:
RECEIVING TEMP: 1.8°C / 1.6°C THERM #: 78
CUSTODY SEALS: ☐ BROKEN ☒ INTACT ☐ NOT USED
CARRIER: ☐ LONE STAR ☐ FEDEX ☐ UPS ☐ OTHER
☐ COURIER DELIVERY
☐ HAND DELIVERED

DHL COC Rev 1 | FEB 2010

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 (903) 794-0625
GOLDER ASSOCIATES

5416 PLAZA DR

TEXARKANA, TX 75501
UNITED STATES US

SHIP DATE: 13JUN15
ACTWGT: 39.50 LB
CAD: 006994167/SSFE2002
DIMS: 27x14x14 IN

BILL THIRD PARTY

TO SAMPLE RECEIVING
DHL 19122434-D FOR A1
2300 DOUBLE CREEK DR

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

FedEx Express

FRI - 14 JUN 10:30A
PRIORITY OVERNIGHT

TRK# 0201 7878 7609 9128

A8 BSMA

78664
TX-US AUS

CUSTODY SEAL
DATE
SIGNATURE

QEC
Quality Environmental Containers
800-255-3950 • www.qecusa.com



ORIGIN ID:GGGA (903) 794-0625
GOLDER ASSOCIATES

5416 PLAZA DR

TEXARKANA, TX 75501
UNITED STATES US

SHIP DATE: 13JUN19
ACTWGT: 58.00 LB
CAD: 006994167/SSFE2002
DIMS: 27x14x14 IN

BILL THIRD PARTY

TO SAMPLE RECEIVING
DHL 19122434 – D FOR A1
2300 DOUBLE CREEK DR

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

FedEx
Express

TRK# 0201 7878 7612 6607

FRI – 14 JUN 10:30A
PRIORITY OVERNIGHT

A8 BSMA

78664
TX-US AUS



CUSTODY SEAL
DATE
SIGNATURE

QEC
Quality Environmental Containers
800-255-3950 • www.qecusa.com

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Golder | Date Received: 6/14/2019

Work Order Number 1906152 | Received by EL

Checklist completed by: _____ (Signature) 6/14/2019 (Date) | Reviewed by (02) (Initials) 6/14/2019 (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 ☐	1.6 °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 tu
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

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

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *21-Jun-19*

CLIENT: Golder
Project: A1 Area Landfill
Lab Order: 1906152

CASE NARRATIVE

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

Method SW6020A - Metals Analysis
Method E300 - Anions Analysis
Method M2320 B - Alkalinity Analysis
Method M3500-Fe D - Ferrous Iron Analysis (this parameter is not NELAP certified)
Method M3500-Fe D - Ferric Iron (calculation) (this calculation is not NELAP certified).
Method M4500-P E - Orthophosphate Analysis
Method M2540C - TDS Analysis

LOG IN

The samples were received and log-in performed on 6/14/19. A total of 6 samples were received. On 6/14/19 several test parameters were added to all samples as per the client. These were performed as reque3sted. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 6/19/19 the matrix spike and matrix spike duplicate recoveries were below control limits for Sodium. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 6/19/19 the PDS recovery was out of control limits for Sodium. This is flagged accordingly. The serial dilution was within control limits for this analyte. No further corrective actions were taken.

FERRIC IRON CALCULATION

The Ferric Iron is calculated as the Total Iron minus the Ferrous Iron.

DHL Analytical, Inc.

Date: *21-Jun-19*

CLIENT: Golder
Project: A1 Area Landfill
Lab Order: 1906152

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1906152-01	BMW-25		06/13/19 09:30 AM	6/14/2019
1906152-02	BMW-29		06/13/19 10:30 AM	6/14/2019
1906152-03	BMW-30		06/13/19 12:50 PM	6/14/2019
1906152-04	BMW-31		06/13/19 02:30 PM	6/14/2019
1906152-05	BMW-32		06/13/19 07:30 AM	6/14/2019
1906152-06	BMW-33		06/13/19 08:15 AM	6/14/2019

Lab Order: 1906152
Client: Golder
Project: A1 Area Landfill

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1906152-01A	BMW-25	06/13/19 09:30 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	06/14/19 02:08 PM	91344
1906152-01B	BMW-25	06/13/19 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
	BMW-25	06/13/19 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
	BMW-25	06/13/19 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
1906152-01C	BMW-25	06/13/19 09:30 AM	Aqueous	M2320 B	Alkalinity Preparation	06/17/19 08:32 AM	91346
	BMW-25	06/13/19 09:30 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-25	06/13/19 09:30 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-25	06/13/19 09:30 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-25	06/13/19 09:30 AM	Aqueous	M4500-P E	Orthophosphate Prep	06/14/19 11:55 AM	91343
	BMW-25	06/13/19 09:30 AM	Aqueous	M2540C	TDS Preparation	06/18/19 01:25 PM	91377
1906152-02A	BMW-29	06/13/19 10:30 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	06/14/19 02:08 PM	91344
1906152-02B	BMW-29	06/13/19 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
	BMW-29	06/13/19 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
1906152-02C	BMW-29	06/13/19 10:30 AM	Aqueous	M2320 B	Alkalinity Preparation	06/17/19 08:32 AM	91346
	BMW-29	06/13/19 10:30 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-29	06/13/19 10:30 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-29	06/13/19 10:30 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-29	06/13/19 10:30 AM	Aqueous	M4500-P E	Orthophosphate Prep	06/14/19 11:55 AM	91343
	BMW-29	06/13/19 10:30 AM	Aqueous	M2540C	TDS Preparation	06/18/19 01:25 PM	91377
1906152-03A	BMW-30	06/13/19 12:50 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	06/14/19 02:08 PM	91344
1906152-03B	BMW-30	06/13/19 12:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
	BMW-30	06/13/19 12:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
1906152-03C	BMW-30	06/13/19 12:50 PM	Aqueous	M2320 B	Alkalinity Preparation	06/17/19 08:32 AM	91346
	BMW-30	06/13/19 12:50 PM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-30	06/13/19 12:50 PM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-30	06/13/19 12:50 PM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-30	06/13/19 12:50 PM	Aqueous	M4500-P E	Orthophosphate Prep	06/14/19 11:55 AM	91343
	BMW-30	06/13/19 12:50 PM	Aqueous	M2540C	TDS Preparation	06/18/19 01:25 PM	91377

Lab Order: 1906152
Client: Golder
Project: A1 Area Landfill

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1906152-04A	BMW-31	06/13/19 02:30 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	06/14/19 02:08 PM	91344
1906152-04B	BMW-31	06/13/19 02:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
	BMW-31	06/13/19 02:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
	BMW-31	06/13/19 02:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
1906152-04C	BMW-31	06/13/19 02:30 PM	Aqueous	M2320 B	Alkalinity Preparation	06/17/19 08:32 AM	91346
	BMW-31	06/13/19 02:30 PM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-31	06/13/19 02:30 PM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-31	06/13/19 02:30 PM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-31	06/13/19 02:30 PM	Aqueous	M4500-P E	Orthophosphate Prep	06/14/19 11:55 AM	91343
	BMW-31	06/13/19 02:30 PM	Aqueous	M2540C	TDS Preparation	06/18/19 01:25 PM	91377
1906152-05A	BMW-32	06/13/19 07:30 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	06/14/19 02:08 PM	91344
1906152-05B	BMW-32	06/13/19 07:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
	BMW-32	06/13/19 07:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
	BMW-32	06/13/19 07:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
1906152-05C	BMW-32	06/13/19 07:30 AM	Aqueous	M2320 B	Alkalinity Preparation	06/17/19 08:32 AM	91346
	BMW-32	06/13/19 07:30 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-32	06/13/19 07:30 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-32	06/13/19 07:30 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-32	06/13/19 07:30 AM	Aqueous	M4500-P E	Orthophosphate Prep	06/14/19 11:55 AM	91343
	BMW-32	06/13/19 07:30 AM	Aqueous	M2540C	TDS Preparation	06/18/19 01:25 PM	91377
1906152-06A	BMW-33	06/13/19 08:15 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	06/14/19 02:08 PM	91344
1906152-06B	BMW-33	06/13/19 08:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
	BMW-33	06/13/19 08:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/18/19 08:21 AM	91364
1906152-06C	BMW-33	06/13/19 08:15 AM	Aqueous	M2320 B	Alkalinity Preparation	06/17/19 08:32 AM	91346
	BMW-33	06/13/19 08:15 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-33	06/13/19 08:15 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-33	06/13/19 08:15 AM	Aqueous	E300	Anion Preparation	06/14/19 11:45 AM	91339
	BMW-33	06/13/19 08:15 AM	Aqueous	M4500-P E	Orthophosphate Prep	06/14/19 11:55 AM	91343

Lab Order: 1906152
Client: Golder
Project: A1 Area Landfill

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1906152-06C	BMW-33	06/13/19 08:15 AM	Aqueous	M2540C	TDS Preparation	06/18/19 01:25 PM	91377

Lab Order: 1906152
Client: Golder
Project: A1 Area Landfill

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1906152-01A	BMW-25	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91344	1	06/21/19	UV/VIS_2_190621A
	BMW-25	Aqueous	M3500-Fe D	Ferrous Iron	91344	1	06/14/19 02:57 PM	UV/VIS_2_190614C
1906152-01B	BMW-25	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	10	06/19/19 02:34 PM	ICP-MS4_190619B
	BMW-25	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	20	06/19/19 02:37 PM	ICP-MS4_190619B
	BMW-25	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	1	06/19/19 12:25 PM	ICP-MS5_190619B
1906152-01C	BMW-25	Aqueous	M2320 B	Alkalinity	91346	1	06/17/19 10:31 AM	TITRATOR_190617A
	BMW-25	Aqueous	E300	Anions by IC method - Water	91339	100	06/14/19 12:17 PM	IC2_190614A
	BMW-25	Aqueous	E300	Anions by IC method - Water	91339	10	06/14/19 02:57 PM	IC2_190614A
	BMW-25	Aqueous	E300	Anions by IC method - Water	91339	1	06/14/19 05:37 PM	IC2_190614A
	BMW-25	Aqueous	M4500-P E	Orthophosphate	91343	1	06/14/19 12:26 PM	UV/VIS_2_190614B
	BMW-25	Aqueous	M2540C	Total Dissolved Solids	91377	1	06/18/19 03:40 PM	WC_190618A
1906152-02A	BMW-29	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91344	1	06/21/19	UV/VIS_2_190621A
	BMW-29	Aqueous	M3500-Fe D	Ferrous Iron	91344	1	06/14/19 02:57 PM	UV/VIS_2_190614C
1906152-02B	BMW-29	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	1	06/19/19 12:27 PM	ICP-MS5_190619B
	BMW-29	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	20	06/19/19 02:39 PM	ICP-MS4_190619B
1906152-02C	BMW-29	Aqueous	M2320 B	Alkalinity	91346	1	06/17/19 11:00 AM	TITRATOR_190617A
	BMW-29	Aqueous	E300	Anions by IC method - Water	91339	100	06/14/19 12:33 PM	IC2_190614A
	BMW-29	Aqueous	E300	Anions by IC method - Water	91339	10	06/14/19 03:13 PM	IC2_190614A
	BMW-29	Aqueous	E300	Anions by IC method - Water	91339	1	06/14/19 05:53 PM	IC2_190614A
	BMW-29	Aqueous	M4500-P E	Orthophosphate	91343	1	06/14/19 12:27 PM	UV/VIS_2_190614B
	BMW-29	Aqueous	M2540C	Total Dissolved Solids	91377	1	06/18/19 03:40 PM	WC_190618A
1906152-03A	BMW-30	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91344	1	06/21/19	UV/VIS_2_190621A
	BMW-30	Aqueous	M3500-Fe D	Ferrous Iron	91344	1	06/14/19 02:57 PM	UV/VIS_2_190614C
1906152-03B	BMW-30	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	10	06/19/19 02:41 PM	ICP-MS4_190619B
	BMW-30	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	1	06/19/19 12:29 PM	ICP-MS5_190619B
1906152-03C	BMW-30	Aqueous	M2320 B	Alkalinity	91346	1	06/17/19 11:15 AM	TITRATOR_190617A
	BMW-30	Aqueous	E300	Anions by IC method - Water	91339	100	06/14/19 12:49 PM	IC2_190614A
	BMW-30	Aqueous	E300	Anions by IC method - Water	91339	10	06/14/19 03:29 PM	IC2_190614A

Lab Order: 1906152
Client: Golder
Project: A1 Area Landfill

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1906152-03C	BMW-30	Aqueous	E300	Anions by IC method - Water	91339	1	06/14/19 06:09 PM	IC2_190614A
	BMW-30	Aqueous	M4500-P E	Orthophosphate	91343	1	06/14/19 12:27 PM	UV/VIS_2_190614B
	BMW-30	Aqueous	M2540C	Total Dissolved Solids	91377	1	06/18/19 03:40 PM	WC_190618A
1906152-04A	BMW-31	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91344	1	06/21/19	UV/VIS_2_190621A
	BMW-31	Aqueous	M3500-Fe D	Ferrous Iron	91344	1	06/14/19 02:58 PM	UV/VIS_2_190614C
1906152-04B	BMW-31	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	1	06/19/19 02:43 PM	ICP-MS4_190619B
	BMW-31	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	10	06/19/19 02:45 PM	ICP-MS4_190619B
	BMW-31	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	1	06/19/19 12:31 PM	ICP-MS5_190619B
1906152-04C	BMW-31	Aqueous	M2320 B	Alkalinity	91346	1	06/17/19 11:19 AM	TITRATOR_190617A
	BMW-31	Aqueous	E300	Anions by IC method - Water	91339	10	06/14/19 03:45 PM	IC2_190614A
	BMW-31	Aqueous	E300	Anions by IC method - Water	91339	1	06/14/19 06:25 PM	IC2_190614A
	BMW-31	Aqueous	E300	Anions by IC method - Water	91339	100	06/14/19 01:05 PM	IC2_190614A
	BMW-31	Aqueous	M4500-P E	Orthophosphate	91343	1	06/14/19 12:28 PM	UV/VIS_2_190614B
	BMW-31	Aqueous	M2540C	Total Dissolved Solids	91377	1	06/18/19 03:40 PM	WC_190618A
1906152-05A	BMW-32	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91344	1	06/21/19	UV/VIS_2_190621A
	BMW-32	Aqueous	M3500-Fe D	Ferrous Iron	91344	1	06/14/19 02:58 PM	UV/VIS_2_190614C
1906152-05B	BMW-32	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	1	06/19/19 12:34 PM	ICP-MS5_190619B
	BMW-32	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	10	06/19/19 02:47 PM	ICP-MS4_190619B
	BMW-32	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	20	06/19/19 03:12 PM	ICP-MS4_190619B
1906152-05C	BMW-32	Aqueous	M2320 B	Alkalinity	91346	1	06/17/19 11:46 AM	TITRATOR_190617A
	BMW-32	Aqueous	E300	Anions by IC method - Water	91339	100	06/14/19 01:21 PM	IC2_190614A
	BMW-32	Aqueous	E300	Anions by IC method - Water	91339	10	06/14/19 04:01 PM	IC2_190614A
	BMW-32	Aqueous	E300	Anions by IC method - Water	91339	1	06/14/19 06:41 PM	IC2_190614A
	BMW-32	Aqueous	M4500-P E	Orthophosphate	91343	1	06/14/19 12:28 PM	UV/VIS_2_190614B
	BMW-32	Aqueous	M2540C	Total Dissolved Solids	91377	1	06/18/19 03:40 PM	WC_190618A
1906152-06A	BMW-33	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91344	1	06/21/19	UV/VIS_2_190621A
	BMW-33	Aqueous	M3500-Fe D	Ferrous Iron	91344	1	06/14/19 02:59 PM	UV/VIS_2_190614C
1906152-06B	BMW-33	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	10	06/19/19 02:51 PM	ICP-MS4_190619B

Lab Order: 1906152
Client: Golder
Project: A1 Area Landfill

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1906152-06B	BMW-33	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91364	1	06/19/19 12:36 PM	ICP-MS5_190619B
1906152-06C	BMW-33	Aqueous	M2320 B	Alkalinity	91346	1	06/17/19 12:05 PM	TITRATOR_190617A
	BMW-33	Aqueous	E300	Anions by IC method - Water	91339	100	06/14/19 01:37 PM	IC2_190614A
	BMW-33	Aqueous	E300	Anions by IC method - Water	91339	10	06/14/19 04:17 PM	IC2_190614A
	BMW-33	Aqueous	E300	Anions by IC method - Water	91339	1	06/14/19 06:57 PM	IC2_190614A
	BMW-33	Aqueous	M4500-P E	Orthophosphate	91343	1	06/14/19 12:28 PM	UV/VIS_2_190614B
	BMW-33	Aqueous	M2540C	Total Dissolved Solids	91377	1	06/18/19 03:40 PM	WC_190618A

DHL Analytical, Inc.

Date: *21-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-25
Project:	A1 Area Landfill	**Lab ID:**	1906152-01
Project No:	19122434-D	**Collection Date:**	06/13/19 09:30 AM
Lab Order:	1906152	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Calcium	167	1.00	3.00		mg/L	10	06/19/19 02:34 PM
Cobalt	0.0130	0.00300	0.00500		mg/L	1	06/19/19 12:25 PM
Iron	0.354	0.0300	0.100		mg/L	1	06/19/19 12:25 PM
Lithium	0.0501	0.00500	0.0100		mg/L	1	06/19/19 12:25 PM
Magnesium	106	1.00	3.00		mg/L	10	06/19/19 02:34 PM
Potassium	7.77	1.00	3.00		mg/L	10	06/19/19 02:34 PM
Sodium	253	2.00	6.00		mg/L	20	06/19/19 02:37 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	65.0	3.00	10.0		mg/L	10	06/14/19 02:57 PM
Fluoride	0.142	0.100	0.400	J	mg/L	1	06/14/19 05:37 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	06/14/19 05:37 PM
Sulfate	556	10.0	30.0		mg/L	10	06/14/19 02:57 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	771	10.0	20.0		mg/L @ pH 4.54	1	06/17/19 10:31 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/17/19 10:31 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/17/19 10:31 AM
Alkalinity, Total (As CaCO3)	771	20.0	20.0		mg/L @ pH 4.54	1	06/17/19 10:31 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.354	0.0500	0.100	N	mg/L	1	06/21/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	06/14/19 02:57 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	06/14/19 12:26 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1650	50.0	50.0		mg/L	1	06/18/19 03:40 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: *21-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-29
Project:	A1 Area Landfill	**Lab ID:**	1906152-02
Project No:	19122434-D	**Collection Date:**	06/13/19 10:30 AM
Lab Order:	1906152	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Calcium	176	2.00	6.00		mg/L	20	06/19/19 02:39 PM
Iron	1.01	0.0300	0.100		mg/L	1	06/19/19 12:27 PM
Lithium	0.114	0.00500	0.0100		mg/L	1	06/19/19 12:27 PM
Magnesium	94.5	2.00	6.00		mg/L	20	06/19/19 02:39 PM
Potassium	15.3	2.00	6.00		mg/L	20	06/19/19 02:39 PM
Sodium	429	2.00	6.00		mg/L	20	06/19/19 02:39 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	36.6	3.00	10.0		mg/L	10	06/14/19 03:13 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/14/19 05:53 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	06/14/19 05:53 PM
Sulfate	867	10.0	30.0		mg/L	10	06/14/19 03:13 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	819	10.0	20.0		mg/L @ pH 4.54	1	06/17/19 11:00 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/17/19 11:00 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/17/19 11:00 AM
Alkalinity, Total (As CaCO3)	819	20.0	20.0		mg/L @ pH 4.54	1	06/17/19 11:00 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.668	0.0500	0.100	N	mg/L	1	06/21/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	0.342	0.0500	0.100	N	mg/L	1	06/14/19 02:57 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	06/14/19 12:27 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2100	50.0	50.0		mg/L	1	06/18/19 03:40 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: *21-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-30
Project:	A1 Area Landfill	**Lab ID:**	1906152-03
Project No:	19122434-D	**Collection Date:**	06/13/19 12:50 PM
Lab Order:	1906152	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Barium	0.0982	0.00300	0.0100		mg/L	1	06/19/19 12:29 PM
Calcium	147	1.00	3.00		mg/L	10	06/19/19 02:41 PM
Iron	3.01	0.0300	0.100		mg/L	1	06/19/19 12:29 PM
Magnesium	65.9	1.00	3.00		mg/L	10	06/19/19 02:41 PM
Potassium	7.05	1.00	3.00		mg/L	10	06/19/19 02:41 PM
Sodium	158	1.00	3.00		mg/L	10	06/19/19 02:41 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	79.5	3.00	10.0		mg/L	10	06/14/19 03:29 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	06/14/19 06:09 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	06/14/19 06:09 PM
Sulfate	574	10.0	30.0		mg/L	10	06/14/19 03:29 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	315	10.0	20.0		mg/L @ pH 4.53	1	06/17/19 11:15 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/17/19 11:15 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/17/19 11:15 AM
Alkalinity, Total (As CaCO3)	315	20.0	20.0		mg/L @ pH 4.53	1	06/17/19 11:15 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	3.01	0.0500	0.100	N	mg/L	1	06/21/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	06/14/19 02:57 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	06/14/19 12:27 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1320	50.0	50.0		mg/L	1	06/18/19 03:40 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: *21-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-31
Project:	A1 Area Landfill	**Lab ID:**	1906152-04
Project No:	19122434-D	**Collection Date:**	06/13/19 02:30 PM
Lab Order:	1906152	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Calcium	1.70	0.100	0.300		mg/L	1	06/19/19 02:43 PM
Iron	0.102	0.0300	0.100		mg/L	1	06/19/19 12:31 PM
Lithium	0.0203	0.00500	0.0100		mg/L	1	06/19/19 12:31 PM
Magnesium	1.52	0.100	0.300		mg/L	1	06/19/19 12:31 PM
Potassium	0.238	0.100	0.300	J	mg/L	1	06/19/19 02:43 PM
Sodium	43.3	1.00	3.00		mg/L	10	06/19/19 02:45 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	24.7	0.300	1.00		mg/L	1	06/14/19 06:25 PM
Fluoride	0.255	0.100	0.400	J	mg/L	1	06/14/19 06:25 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	06/14/19 06:25 PM
Sulfate	34.4	1.00	3.00		mg/L	1	06/14/19 06:25 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	30.4	10.0	20.0		mg/L @ pH 4.49	1	06/17/19 11:19 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.49	1	06/17/19 11:19 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.49	1	06/17/19 11:19 AM
Alkalinity, Total (As CaCO3)	30.4	20.0	20.0		mg/L @ pH 4.49	1	06/17/19 11:19 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.102	0.0500	0.100	N	mg/L	1	06/21/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	06/14/19 02:58 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	06/14/19 12:28 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	327	10.0	10.0		mg/L	1	06/18/19 03:40 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: *21-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-32
Project:	A1 Area Landfill	**Lab ID:**	1906152-05
Project No:	19122434-D	**Collection Date:**	06/13/19 07:30 AM
Lab Order:	1906152	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Calcium	134	1.00	3.00		mg/L	10	06/19/19 02:47 PM
Cobalt	0.00705	0.00300	0.00500		mg/L	1	06/19/19 12:34 PM
Iron	4.61	0.0300	0.100		mg/L	1	06/19/19 12:34 PM
Lithium	0.115	0.00500	0.0100		mg/L	1	06/19/19 12:34 PM
Magnesium	102	1.00	3.00		mg/L	10	06/19/19 02:47 PM
Potassium	4.56	1.00	3.00		mg/L	10	06/19/19 02:47 PM
Sodium	266	2.00	6.00		mg/L	20	06/19/19 03:12 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	364	3.00	10.0		mg/L	10	06/14/19 04:01 PM
Fluoride	0.822	0.100	0.400		mg/L	1	06/14/19 06:41 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	06/14/19 06:41 PM
Sulfate	446	10.0	30.0		mg/L	10	06/14/19 04:01 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	456	10.0	20.0		mg/L @ pH 4.54	1	06/17/19 11:46 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/17/19 11:46 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/17/19 11:46 AM
Alkalinity, Total (As CaCO3)	456	20.0	20.0		mg/L @ pH 4.54	1	06/17/19 11:46 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	4.61	0.0500	0.100	N	mg/L	1	06/21/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	06/14/19 02:58 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.0340	0.0300	0.100	J	mg/L	1	06/14/19 12:28 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1720	50.0	50.0		mg/L	1	06/18/19 03:40 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: *21-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-33
Project:	A1 Area Landfill	**Lab ID:**	1906152-06
Project No:	19122434-D	**Collection Date:**	06/13/19 08:15 AM
Lab Order:	1906152	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	06/19/19 12:36 PM
Calcium	97.5	1.00	3.00		mg/L	10	06/19/19 02:51 PM
Cobalt	0.0176	0.00300	0.00500		mg/L	1	06/19/19 12:36 PM
Iron	2.83	0.0300	0.100		mg/L	1	06/19/19 12:36 PM
Lithium	0.0206	0.00500	0.0100		mg/L	1	06/19/19 12:36 PM
Magnesium	56.5	1.00	3.00		mg/L	10	06/19/19 02:51 PM
Potassium	6.29	1.00	3.00		mg/L	10	06/19/19 02:51 PM
Sodium	207	1.00	3.00		mg/L	10	06/19/19 02:51 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	83.8	3.00	10.0		mg/L	10	06/14/19 04:17 PM
Fluoride	0.342	0.100	0.400	J	mg/L	1	06/14/19 06:57 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	06/14/19 06:57 PM
Sulfate	256	10.0	30.0		mg/L	10	06/14/19 04:17 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	528	10.0	20.0		mg/L @ pH 4.53	1	06/17/19 12:05 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/17/19 12:05 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/17/19 12:05 PM
Alkalinity, Total (As CaCO3)	528	20.0	20.0		mg/L @ pH 4.53	1	06/17/19 12:05 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	2.83	0.0500	0.100	N	mg/L	1	06/21/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	06/14/19 02:59 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	06/14/19 12:28 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1100	50.0	50.0		mg/L	1	06/18/19 03:40 PM

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

CLIENT: Golder
Work Order: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190619B

The QC data in batch 91364 applies to the following samples: 1906152-01B, 1906152-02B, 1906152-03B, 1906152-04B, 1906152-05B, 1906152-06B

Sample ID **MB-91364** Batch ID: **91364** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_190619B** Analysis Date: **6/19/2019 2:20:00 PM** Prep Date: **6/18/2019**

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

Sample ID **LCS-91364** Batch ID: **91364** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_190619B** Analysis Date: **6/19/2019 2:22:00 PM** Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.85	0.300	5.00	0	97.0	80	120			
Potassium	4.93	0.300	5.00	0	98.6	80	120			
Sodium	5.25	0.300	5.00	0	105	80	120			

Sample ID **LCSD-91364** Batch ID: **91364** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_190619B** Analysis Date: **6/19/2019 2:24:00 PM** Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.83	0.300	5.00	0	96.6	80	120	0.496	15	
Potassium	5.07	0.300	5.00	0	101	80	120	2.80	15	
Sodium	5.32	0.300	5.00	0	106	80	120	1.32	15	

Sample ID **1906156-01A SD** Batch ID: **91364** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_190619B** Analysis Date: **6/19/2019 2:32:00 PM** Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	8.18	1.50	0	8.11				0.846	10	
Potassium	2.17	1.50	0	2.15				0.715	10	
Sodium	76.4	1.50	0	73.6				3.77	10	

Sample ID **1906156-01A PDS** Batch ID: **91364** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_190619B** Analysis Date: **6/19/2019 2:53:00 PM** Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	12.4	0.300	5.00	8.11	86.2	80	120			
Potassium	6.91	0.300	5.00	2.15	95.1	80	120			
Sodium	73.3	0.300	5.00	73.6	-5.52	80	120			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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190619B

Sample ID **1906156-01A MS**	Batch ID: **91364**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_190619B**	Analysis Date: **6/19/2019 2:55:00 PM**	Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	12.8	0.300	5.00	8.11	92.9	80	120			
Potassium	7.18	0.300	5.00	2.15	100	80	120			
Sodium	76.9	0.300	5.00	73.6	67.1	80	120			S

Sample ID **1906156-01A MSD**	Batch ID: **91364**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_190619B**	Analysis Date: **6/19/2019 2:57:00 PM**	Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	12.7	0.300	5.00	8.11	92.7	80	120	0.075	15	
Potassium	7.12	0.300	5.00	2.15	99.2	80	120	0.869	15	
Sodium	75.0	0.300	5.00	73.6	29.2	80	120	2.49	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190619B

Sample ID **ICV-190619**	Batch ID: **R104661**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_190619B**	Analysis Date: **6/19/2019 11:08:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.53	0.300	2.50	0	101	90	110			
Magnesium	2.44	0.300	2.50	0	97.7	90	110			
Potassium	2.53	0.300	2.50	0	101	90	110			
Sodium	2.61	0.300	2.50	0	104	90	110			

Sample ID **LCVL-190619**	Batch ID: **R104661**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190619B**	Analysis Date: **6/19/2019 11:12:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.101	0.300	0.100	0	101	70	130			
Magnesium	0.0980	0.300	0.100	0	98.0	70	130			
Potassium	0.0981	0.300	0.100	0	98.1	70	130			
Sodium	0.104	0.300	0.100	0	104	70	130			

Sample ID **CCV1-190619**	Batch ID: **R104661**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190619B**	Analysis Date: **6/19/2019 11:46:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.77	0.300	5.00	0	95.3	90	110			
Magnesium	4.91	0.300	5.00	0	98.2	90	110			
Potassium	4.90	0.300	5.00	0	98.0	90	110			
Sodium	5.18	0.300	5.00	0	104	90	110			

Sample ID **LCVL1-190619**	Batch ID: **R104661**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190619B**	Analysis Date: **6/19/2019 11:53:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.101	0.300	0.100	0	101	70	130			
Magnesium	0.0993	0.300	0.100	0	99.3	70	130			
Potassium	0.0994	0.300	0.100	0	99.4	70	130			
Sodium	0.124	0.300	0.100	0	124	70	130			

Sample ID **CCV2-190619**	Batch ID: **R104661**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190619B**	Analysis Date: **6/19/2019 2:59:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.77	0.300	5.00	0	95.4	90	110			
Magnesium	4.95	0.300	5.00	0	99.1	90	110			
Potassium	4.94	0.300	5.00	0	98.9	90	110			
Sodium	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190619B

Sample ID **LCVL2-190619**	Batch ID: **R104661**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190619B**	Analysis Date: **6/19/2019 3:06:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0955	0.300	0.100	0	95.5	70	130			
Magnesium	0.0994	0.300	0.100	0	99.4	70	130			
Potassium	0.0956	0.300	0.100	0	95.6	70	130			
Sodium	0.112	0.300	0.100	0	112	70	130			

Sample ID **CCV3-190619**	Batch ID: **R104661**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190619B**	Analysis Date: **6/19/2019 3:14:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	5.12	0.300	5.00	0	102	90	110			

Sample ID **LCVL3-190619**	Batch ID: **R104661**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190619B**	Analysis Date: **6/19/2019 3:21:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	0.109	0.300	0.100	0	109	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190619B

The QC data in batch 91364 applies to the following samples: 1906152-01B, 1906152-02B, 1906152-03B, 1906152-04B, 1906152-05B, 1906152-06B

Sample ID **MB-91364** Batch ID: **91364** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_190619B** Analysis Date: **6/19/2019 12:04:00 PM** Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Cobalt	<0.00300	0.00500								
Iron	<0.0300	0.100								
Lithium	<0.00500	0.0100								
Magnesium	<0.100	0.300								

Sample ID **LCS-91364** Batch ID: **91364** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_190619B** Analysis Date: **6/19/2019 12:07:00 PM** Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.206	0.00500	0.200	0	103	80	120			
Barium	0.202	0.0100	0.200	0	101	80	120			
Cobalt	0.211	0.00500	0.200	0	105	80	120			
Iron	5.08	0.100	5.00	0	102	80	120			
Lithium	0.203	0.0100	0.200	0	102	80	120			
Magnesium	4.99	0.300	5.00	0	99.9	80	120			

Sample ID **LCSD-91364** Batch ID: **91364** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_190619B** Analysis Date: **6/19/2019 12:09:00 PM** Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.208	0.00500	0.200	0	104	80	120	0.963	15	
Barium	0.201	0.0100	0.200	0	101	80	120	0.125	15	
Cobalt	0.210	0.00500	0.200	0	105	80	120	0.544	15	
Iron	5.10	0.100	5.00	0	102	80	120	0.434	15	
Lithium	0.201	0.0100	0.200	0	101	80	120	0.963	15	
Magnesium	5.10	0.300	5.00	0	102	80	120	2.20	15	

Sample ID **1906156-01A SD** Batch ID: **91364** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_190619B** Analysis Date: **6/19/2019 12:16:00 PM** Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	<0.0100	0.0250	0	0				0	10	
Barium	0.190	0.0500	0	0.188				1.33	10	
Cobalt	0.0257	0.0250	0	0.0256				0.487	10	
Iron	0.159	0.500	0	0.161				1.10	10	
Lithium	<0.0250	0.0500	0	0.0130				0	10	
Magnesium	4.47	1.50	0	4.44				0.596	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190619B

Sample ID **1906156-01A PDS**	Batch ID: **91364**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS5_190619B**	Analysis Date: **6/19/2019 12:38:00 PM**	Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.187	0.00500	0.200	0	93.5	80	120			
Barium	0.374	0.0100	0.200	0.188	93.3	80	120			
Cobalt	0.221	0.00500	0.200	0.0256	97.5	80	120			
Iron	5.30	0.100	5.00	0.161	103	80	120			
Lithium	0.218	0.0100	0.200	0.0130	102	80	120			
Magnesium	9.48	0.300	5.00	4.44	101	80	120			

Sample ID **1906156-01A MS**	Batch ID: **91364**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_190619B**	Analysis Date: **6/19/2019 12:40:00 PM**	Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.193	0.00500	0.200	0	96.6	80	120			
Barium	0.384	0.0100	0.200	0.188	97.9	80	120			
Cobalt	0.225	0.00500	0.200	0.0256	99.6	80	120			
Iron	5.29	0.100	5.00	0.161	103	80	120			
Lithium	0.216	0.0100	0.200	0.0130	102	80	120			
Magnesium	9.65	0.300	5.00	4.44	104	80	120			

Sample ID **1906156-01A MSD**	Batch ID: **91364**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_190619B**	Analysis Date: **6/19/2019 12:42:00 PM**	Prep Date: **6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.194	0.00500	0.200	0	96.9	80	120	0.339	15	
Barium	0.387	0.0100	0.200	0.188	99.8	80	120	0.972	15	
Cobalt	0.226	0.00500	0.200	0.0256	100	80	120	0.650	15	
Iron	5.29	0.100	5.00	0.161	103	80	120	0.019	15	
Lithium	0.216	0.0100	0.200	0.0130	101	80	120	0.236	15	
Magnesium	9.55	0.300	5.00	4.44	102	80	120	0.948	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190619B

Sample ID **ICV-190619**	Batch ID: **R104660**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_190619B**	Analysis Date: **6/19/2019 10:49:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.102	0.00500	0.100	0	102	90	110			
Barium	0.0979	0.0100	0.100	0	97.9	90	110			
Cobalt	0.102	0.00500	0.100	0	102	90	110			
Iron	2.48	0.100	2.50	0	99.4	90	110			
Lithium	0.101	0.0100	0.100	0	101	90	110			
Magnesium	2.45	0.300	2.50	0	98.2	90	110			

Sample ID **LCVL-190619**	Batch ID: **R104660**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190619B**	Analysis Date: **6/19/2019 11:01:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00481	0.00500	0.00500	0	96.2	70	130			
Barium	0.00509	0.0100	0.00500	0	102	70	130			
Cobalt	0.00504	0.00500	0.00500	0	101	70	130			
Iron	0.0961	0.100	0.100	0	96.1	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Magnesium	0.0951	0.300	0.100	0	95.1	70	130			

Sample ID **CCV1-190619**	Batch ID: **R104660**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190619B**	Analysis Date: **6/19/2019 11:50:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.203	0.00500	0.200	0	102	90	110			
Barium	0.202	0.0100	0.200	0	101	90	110			
Cobalt	0.207	0.00500	0.200	0	103	90	110			
Iron	5.05	0.100	5.00	0	101	90	110			
Lithium	0.201	0.0100	0.200	0	100	90	110			
Magnesium	5.02	0.300	5.00	0	100	90	110			

Sample ID **LCVL1-190619**	Batch ID: **R104660**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190619B**	Analysis Date: **6/19/2019 11:56:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00500	0.00500	0.00500	0	100	70	130			
Barium	0.00470	0.0100	0.00500	0	94.1	70	130			
Cobalt	0.00498	0.00500	0.00500	0	99.5	70	130			
Iron	0.0962	0.100	0.100	0	96.2	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Magnesium	0.100	0.300	0.100	0	100	70	130			

Qualifiers:

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

CLIENT: Golder
Work Order: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190619B

Sample ID **CCV2-190619**	Batch ID: **R104660**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190619B**	Analysis Date: **6/19/2019 12:45:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.202	0.00500	0.200	0	101	90	110			
Barium	0.201	0.0100	0.200	0	101	90	110			
Cobalt	0.209	0.00500	0.200	0	105	90	110			
Iron	5.12	0.100	5.00	0	102	90	110			
Lithium	0.203	0.0100	0.200	0	101	90	110			
Magnesium	5.09	0.300	5.00	0	102	90	110			

Sample ID **LCVL2-190619**	Batch ID: **R104660**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190619B**	Analysis Date: **6/19/2019 12:50:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00496	0.00500	0.00500	0	99.3	70	130			
Barium	0.00514	0.0100	0.00500	0	103	70	130			
Cobalt	0.00512	0.00500	0.00500	0	102	70	130			
Iron	0.0963	0.100	0.100	0	96.3	70	130			
Lithium	0.0104	0.0100	0.0100	0	104	70	130			
Magnesium	0.0964	0.300	0.100	0	96.4	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190614A

The QC data in batch 91339 applies to the following samples: 1906152-01C, 1906152-02C, 1906152-03C, 1906152-04C, 1906152-05C, 1906152-06C

Sample ID	**MB-91339**	Batch ID:	**91339**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_190614A**	Analysis Date:	**6/14/2019 10:18:32 AM**	Prep Date:	**6/14/2019**

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-91339**	Batch ID:	**91339**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_190614A**	Analysis Date:	**6/14/2019 10:34:32 AM**	Prep Date:	**6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.0	1.00	10.00	0	100	90	110			
Fluoride	3.99	0.400	4.000	0	99.8	90	110			
Nitrate-N	5.09	0.500	5.000	0	102	90	110			
Sulfate	30.3	3.00	30.00	0	101	90	110			

Sample ID	**LCSD-91339**	Batch ID:	**91339**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_190614A**	Analysis Date:	**6/14/2019 10:50:32 AM**	Prep Date:	**6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.1	1.00	10.00	0	101	90	110	0.555	20	
Fluoride	4.01	0.400	4.000	0	100	90	110	0.489	20	
Nitrate-N	5.10	0.500	5.000	0	102	90	110	0.295	20	
Sulfate	30.5	3.00	30.00	0	102	90	110	0.758	20	

Sample ID	**1906110-04BMS**	Batch ID:	**91339**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190614A**	Analysis Date:	**6/14/2019 11:26:46 AM**	Prep Date:	**6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2380	100	2000	317.4	103	90	110			
Fluoride	2080	40.0	2000	0	104	90	110			
Nitrate-N	451	50.0	451.6	0	99.8	90	110			
Sulfate	4020	300	2000	2016	100	90	110			

Sample ID	**1906110-04BMSD**	Batch ID:	**91339**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190614A**	Analysis Date:	**6/14/2019 11:42:46 AM**	Prep Date:	**6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2390	100	2000	317.4	103	90	110	0.283	20	
Fluoride	2090	40.0	2000	0	104	90	110	0.334	20	
Nitrate-N	452	50.0	451.6	0	100	90	110	0.221	20	
Sulfate	4040	300	2000	2016	101	90	110	0.513	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190614A

Sample ID **ICV-190614**	Batch ID: **R104590**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_190614A**	Analysis Date: **6/14/2019 9:46:32 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	25.7	1.00	25.00	0	103	90	110			
Fluoride	10.2	0.400	10.00	0	102	90	110			
Nitrate-N	13.1	0.500	12.50	0	105	90	110			
Sulfate	77.5	3.00	75.00	0	103	90	110			

Sample ID **CCV1-190614**	Batch ID: **R104590**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190614A**	Analysis Date: **6/14/2019 2:25:37 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Fluoride	4.09	0.400	4.000	0	102	90	110			
Nitrate-N	5.17	0.500	5.000	0	103	90	110			
Sulfate	30.9	3.00	30.00	0	103	90	110			

Sample ID **CCV2-190614**	Batch ID: **R104590**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190614A**	Analysis Date: **6/14/2019 5:05:37 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	4.13	0.400	4.000	0	103	90	110			
Nitrate-N	5.22	0.500	5.000	0	104	90	110			
Sulfate	31.2	3.00	30.00	0	104	90	110			

Sample ID **CCV3-190614**	Batch ID: **R104590**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190614A**	Analysis Date: **6/14/2019 7:45:37 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	4.17	0.400	4.000	0	104	90	110			
Nitrate-N	5.25	0.500	5.000	0	105	90	110			
Sulfate	31.6	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190617A

The QC data in batch 91346 applies to the following samples: 1906152-01C, 1906152-02C, 1906152-03C, 1906152-04C, 1906152-05C, 1906152-06C

Sample ID **MB-91346**	Batch ID: **91346**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.53**
SampType: **MBLK**	Run ID: **TITRATOR_190617A**	Analysis Date: **6/17/2019 9:13:00 AM**	Prep Date: **6/17/2019**

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-91346**	Batch ID: **91346**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.23**
SampType: **LCS**	Run ID: **TITRATOR_190617A**	Analysis Date: **6/17/2019 9:17:00 AM**	Prep Date: **6/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	51.5	20.0	50.00	0	103	74	129			

Sample ID **1906152-04C DUP**	Batch ID: **91346**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.5**
SampType: **DUP**	Run ID: **TITRATOR_190617A**	Analysis Date: **6/17/2019 11:22:00 AM**	Prep Date: **6/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	30.3	20.0	0	30.40				0.329	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)	30.3	20.0	0	30.40				0.329	20	

Sample ID **1906152-06C DUP**	Batch ID: **91346**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.53**
SampType: **DUP**	Run ID: **TITRATOR_190617A**	Analysis Date: **6/17/2019 12:24:00 PM**	Prep Date: **6/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	525	20.0	0	527.6				0.418	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)	525	20.0	0	527.6				0.418	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190617A

Sample ID **ICV-190617**	Batch ID: **R104621**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.34**
SampType: **ICV**	Run ID: **TITRATOR_190617A**	Analysis Date: **6/17/2019 9:10:00 AM**	Prep Date: **6/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	7.60	20.0	0							
Alkalinity, Carbonate (As CaCO3)	92.5	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	100	20.0	100.0	0	100	98	102			

Sample ID **CCV1-190617**	Batch ID: **R104621**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.33**
SampType: **CCV**	Run ID: **TITRATOR_190617A**	Analysis Date: **6/17/2019 11:27:00 AM**	Prep Date: **6/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	24.5	20.0	0							
Alkalinity, Carbonate (As CaCO3)	74.1	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	98.6	20.0	100.0	0	98.6	90	110			

Sample ID **CCV2-190617**	Batch ID: **R104621**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.37**
SampType: **CCV**	Run ID: **TITRATOR_190617A**	Analysis Date: **6/17/2019 12:53:00 PM**	Prep Date: **6/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	33.0	20.0	0							
Alkalinity, Carbonate (As CaCO3)	65.8	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	98.8	20.0	100.0	0	98.8	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190614B

The QC data in batch 91343 applies to the following samples: 1906152-01C, 1906152-02C, 1906152-03C, 1906152-04C, 1906152-05C, 1906152-06C

Sample ID **MB-91343**	Batch ID: **91343**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MBLK**	Run ID: **UV/VIS_2_190614B**	Analysis Date: **6/14/2019 12:25:00 PM**	Prep Date: **6/14/2019**

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

Sample ID **LCS-91343**	Batch ID: **91343**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **LCS**	Run ID: **UV/VIS_2_190614B**	Analysis Date: **6/14/2019 12:25:00 PM**	Prep Date: **6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.479	0.100	0.5000	0	95.8	80	120			

Sample ID **LCSD-91343**	Batch ID: **91343**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **LCSD**	Run ID: **UV/VIS_2_190614B**	Analysis Date: **6/14/2019 12:25:00 PM**	Prep Date: **6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.477	0.100	0.5000	0	95.4	80	120	0.418	15	

Sample ID **1906152-01CMS**	Batch ID: **91343**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MS**	Run ID: **UV/VIS_2_190614B**	Analysis Date: **6/14/2019 12:26:00 PM**	Prep Date: **6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.514	0.100	0.5000	0	103	80	120			

Sample ID **1906152-01CMSD**	Batch ID: **91343**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MSD**	Run ID: **UV/VIS_2_190614B**	Analysis Date: **6/14/2019 12:26:00 PM**	Prep Date: **6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.516	0.100	0.5000	0	103	80	120	0.388	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190614B

Sample ID **ICV-190614**	Batch ID: **R104598**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_190614B**	Analysis Date: **6/14/2019 12:24:00 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 **CCV1-190614**	Batch ID: **R104598**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190614B**	Analysis Date: **6/14/2019 12:29:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.547	0.100	0.5000	0	109	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190614C

The QC data in batch 91344 applies to the following samples: 1906152-01A, 1906152-02A, 1906152-03A, 1906152-04A, 1906152-05A, 1906152-06A

Sample ID **MB-91344**	Batch ID: **91344**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MBLK**	Run ID: **UV/VIS_2_190614C**	Analysis Date: **6/14/2019 2:51:00 PM**	Prep Date: **6/14/2019**

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

Sample ID **LCS-91344**	Batch ID: **91344**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **LCS**	Run ID: **UV/VIS_2_190614C**	Analysis Date: **6/14/2019 2:52:00 PM**	Prep Date: **6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0968	0.100	0.1000	0	96.8	85	115			N

Sample ID **LCSD-91344**	Batch ID: **91344**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **LCSD**	Run ID: **UV/VIS_2_190614C**	Analysis Date: **6/14/2019 2:52:00 PM**	Prep Date: **6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0877	0.100	0.1000	0	87.7	85	115	9.92	15	N

Sample ID **1906089-01AMS**	Batch ID: **91344**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MS**	Run ID: **UV/VIS_2_190614C**	Analysis Date: **6/14/2019 2:54:00 PM**	Prep Date: **6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0880	0.100	0.1000	0	88.0	85	115			N

Sample ID **1906089-01AMSD**	Batch ID: **91344**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MSD**	Run ID: **UV/VIS_2_190614C**	Analysis Date: **6/14/2019 2:54:00 PM**	Prep Date: **6/14/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0896	0.100	0.1000	0	89.6	85	115	1.77	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190614C

Sample ID **ICV-190614**	Batch ID: **R104612**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_190614C**	Analysis Date: **6/14/2019 2:50:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0902	0.100	0.1000	0	90.2	85	115			N

Sample ID **CCV1-190614**	Batch ID: **R104612**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190614C**	Analysis Date: **6/14/2019 3:01:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.192	0.100	0.2000	0	96.1	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: 1906152
Project: A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: WC_190618A

The QC data in batch 91377 applies to the following samples: 1906152-01C, 1906152-02C, 1906152-03C, 1906152-04C, 1906152-05C, 1906152-06C

Sample ID	**MB-91377**	Batch ID:	**91377**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_190618A**	Analysis Date:	**6/18/2019 3:40:00 PM**	Prep Date:	**6/18/2019**

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-91377**	Batch ID:	**91377**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_190618A**	Analysis Date:	**6/18/2019 3:40:00 PM**	Prep Date:	**6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	756	10.0	745.6	0	101	90	113			

Sample ID	**1906152-01C-DUP**	Batch ID:	**91377**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190618A**	Analysis Date:	**6/18/2019 3:40:00 PM**	Prep Date:	**6/18/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	1620	50.0	0	1645				1.84	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

July 19, 2019

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

Order No.: 1907114

RE: Luminant-MLSES-A1 Area Landfill

Dear Will Vienne:

DHL Analytical, Inc. received 4 sample(s) on 7/10/2019 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

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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

№ 83671

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: 7-9-19 PAGE 1 OF 1
PO #: 19122262-D DHL WORK ORDER #: 1907114
PROJECT LOCATION OR NAME: LUMINANT - MLSES - A1 AREA LANDFILL
CLENT PROJECT #: 19122262-D COLLECTOR: J. BRAMTON

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 ☐ | SVOC8270 ☐ PAH8270 ☐ HOLD PAH ☐ SVOC625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ | 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ | 8321 HERB ☐ T PHOS; AMMONIA ☐ | METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐ | RCRA ☐ TX11 ☐ ___ ☐ | PH ☐ HEX CHROM ☐ ALKALINITY ☐ COD ☐ | CHLORIDE ☐ ANIONS ___ ☐ | TCLP-SVOC ☐ VOC ☐ PEST ☐ HERB ☐ | TCLP-METALS ☐ RCRA 8 ☐ TX-11 ☐ Pb ☐ | RCI ☐ FLASHPOINT ☐ DGAS ☐ | TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐ | LITHIUM | COBALT | FIELD NOTES

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES	FIELD NOTES
BMW-29	01	7-8-19	0945	W	P	1		X		X		LITHIUM X	
BMW-32	02	↓	1420	W	P	1		X		X		LITHIUM X	
BMW-25	03	↓	1255	W	P	1		X		X		COBALT X	
AIV-18-OB-95	04	↓	1135	W	P	1		X		X		LITHIUM X	

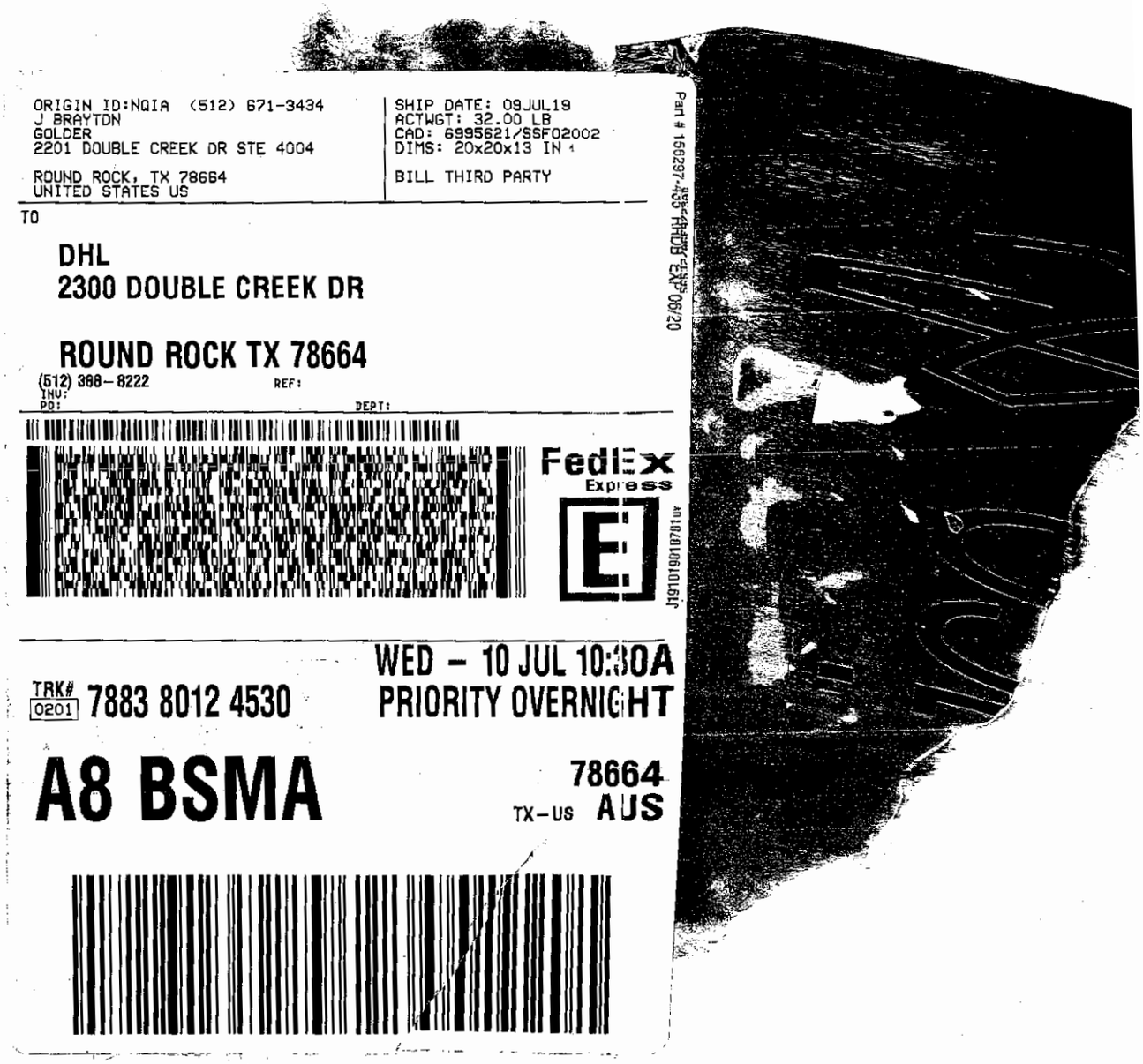
RELINQUISHED BY: (Signature) DATE/TIME 7-9-19 1800 RECEIVED BY: (Signature) FedEx
RELINQUISHED BY: (Signature) FedEx DATE/TIME 7/10/19 1011 RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

☐ 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: 1.4°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



ORIGIN ID:NQIA (512) 671-3434
J BRAYTON
GOLDER
2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 09JUL19
ACTWGT: 32.00 LB
CAD: 6995621/SSF02002
DIMS: 20x20x13 IN

BILL THIRD PARTY

TO

DHL
2300 DOUBLE CREEK DR

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

FedEx Express

TRK# 0201 7883 8012 4530

WED - 10 JUL 10:30A
PRIORITY OVERNIGHT

A8 BSMA

78664
TX-US AUS

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Golder | Date Received: 7/10/2019

Work Order Number 1907114 | Received by JW

Checklist completed by: Signature 7/10/2019 Date | Reviewed by Initials 7/10/2019 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 ☐	1.4 °C
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH<2 acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted?		Checked by
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:** *19-Jul-19*

CLIENT: Golder
Project: Luminant-MLSES-A1 Area Landfill
Lab Order: 1907114

CASE NARRATIVE

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

Method SW6020A - Metals Analysis

LOG IN

The samples were received and log-in performed on 7/10/2019. A total of 4 samples were received and analyzed. The samples arrived in good condition and were properly packaged. All method blanks, laboratory spikes, and/or matrix spikes met quality assurance objectives.

DHL Analytical, Inc.

Date: *19-Jul-19*

CLIENT: Golder
Project: Luminant-MLSES-A1 Area Landfill
Lab Order: 1907114

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1907114-01	BMW-29		07/08/19 09:45 AM	7/10/2019
1907114-02	BMW-32		07/08/19 02:20 PM	7/10/2019
1907114-03	BMW-25		07/08/19 12:55 PM	7/10/2019
1907114-04	A1V-18-OB-95		07/08/19 11:35 AM	7/10/2019

Lab Order: 1907114
Client: Golder
Project: Luminant-MLSES-A1 Area Landfi

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1907114-01A	BMW-29	07/08/19 09:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	07/12/19 10:48 AM	91752
1907114-02A	BMW-32	07/08/19 02:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	07/12/19 10:48 AM	91752
1907114-03A	BMW-25	07/08/19 12:55 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	07/12/19 10:48 AM	91752
1907114-04A	A1V-18-OB-95	07/08/19 11:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	07/12/19 10:48 AM	91752
	A1V-18-OB-95	07/08/19 11:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	07/12/19 10:48 AM	91752

Lab Order: 1907114
Client: Golder
Project: Luminant-MLSES-A1 Area Landfi

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1907114-01A	BMW-29	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91752	1	07/15/19 11:41 AM	ICP-MS5_190715A
1907114-02A	BMW-32	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91752	1	07/15/19 11:43 AM	ICP-MS5_190715A
1907114-03A	BMW-25	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91752	1	07/15/19 11:45 AM	ICP-MS5_190715A
1907114-04A	A1V-18-OB-95	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91752	1	07/15/19 11:32 AM	ICP-MS5_190715A
	A1V-18-OB-95	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91752	1	07/16/19 11:00 AM	ICP-MS4_190716A

DHL Analytical, Inc.

Date: *19-Jul-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-29
Project:	Luminant-MLSES-A1 Area Landfill	**Lab ID:**	1907114-01
Project No:	19122262-D	**Collection Date:**	07/08/19 09:45 AM
Lab Order:	1907114	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Lithium	0.104	0.00500	0.0100		mg/L	1	07/15/19 11:41 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: *19-Jul-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-32
Project:	Luminant-MLSES-A1 Area Landfill	**Lab ID:**	1907114-02
Project No:	19122262-D	**Collection Date:**	07/08/19 02:20 PM
Lab Order:	1907114	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Lithium	0.116	0.00500	0.0100		mg/L	1	07/15/19 11:43 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: *19-Jul-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-25
Project:	Luminant-MLSES-A1 Area Landfill	**Lab ID:**	1907114-03
Project No:	19122262-D	**Collection Date:**	07/08/19 12:55 PM
Lab Order:	1907114	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Cobalt	0.00514	0.00300	0.00500		mg/L	1	07/15/19 11:45 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: *19-Jul-19*

CLIENT:	Golder	**Client Sample ID:**	A1V-18-OB-95
Project:	Luminant-MLSES-A1 Area Landfill	**Lab ID:**	1907114-04
Project No:	19122262-D	**Collection Date:**	07/08/19 11:35 AM
Lab Order:	1907114	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Lithium	0.0454	0.00500	0.0100		mg/L	1	07/15/19 11:32 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: 1907114
Project: Luminant-MLSES-A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190715A

The QC data in batch 91752 applies to the following samples: 1907114-01A, 1907114-02A, 1907114-03A, 1907114-04A

Sample ID **MB-91752** Batch ID: **91752** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_190715A** Analysis Date: **7/15/2019 11:23:00 AM** Prep Date: **7/12/2019**

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

Sample ID **LCS-91752** Batch ID: **91752** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_190715A** Analysis Date: **7/15/2019 11:26:00 AM** Prep Date: **7/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.205	0.00500	0.200	0	102	80	120			
Lithium	0.201	0.0100	0.200	0	100	80	120			

Sample ID **LCSD-91752** Batch ID: **91752** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_190715A** Analysis Date: **7/15/2019 11:28:00 AM** Prep Date: **7/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.205	0.00500	0.200	0	102	80	120	0.097	15	
Lithium	0.200	0.0100	0.200	0	100	80	120	0.171	15	

Sample ID **1907114-04A SD** Batch ID: **91752** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_190715A** Analysis Date: **7/15/2019 11:34:00 AM** Prep Date: **7/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	<0.0150	0.0250	0	0				0	10	
Lithium	0.0460	0.0500	0	0.0454				1.23	10	

Sample ID **1907114-04A PDS** Batch ID: **91752** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_190715A** Analysis Date: **7/15/2019 11:56:00 AM** Prep Date: **7/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.189	0.00500	0.200	0	94.7	80	120			
Lithium	0.247	0.0100	0.200	0.0454	101	80	120			

Sample ID **1907114-04A MS** Batch ID: **91752** TestNo: **SW6020A** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS5_190715A** Analysis Date: **7/15/2019 11:58:00 AM** Prep Date: **7/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.191	0.00500	0.200	0	95.3	80	120			
Lithium	0.244	0.0100	0.200	0.0454	99.4	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: 1907114
Project: Luminant-MLSES-A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190715A

Sample ID **1907114-04A MSD**	Batch ID: **91752**	TestNo: **SW6020A**	Units: **mg/L**		
SampType: **MSD**	Run ID: **ICP-MS5_190715A**	Analysis Date: **7/15/2019 12:01:00 PM**	Prep Date: **7/12/2019**		

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.190	0.00500	0.200	0	94.9	80	120	0.463	15	
Lithium	0.242	0.0100	0.200	0.0454	98.1	80	120	1.07	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: 1907114
Project: Luminant-MLSES-A1 Area Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190715A

Sample ID **ICV-190715**	Batch ID: **R105116**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_190715A**	Analysis Date: **7/15/2019 11:07:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.101	0.00500	0.100	0	101	90	110			
Lithium	0.103	0.0100	0.100	0	103	90	110			

Sample ID **LCVL-190715**	Batch ID: **R105116**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190715A**	Analysis Date: **7/15/2019 11:15:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.00489	0.00500	0.00500	0	97.7	70	130			
Lithium	0.0103	0.0100	0.0100	0	103	70	130			

Sample ID **CCV1-190715**	Batch ID: **R105116**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190715A**	Analysis Date: **7/15/2019 12:03:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.192	0.00500	0.200	0	96.1	90	110			
Lithium	0.197	0.0100	0.200	0	98.7	90	110			

Sample ID **LCVL1-190715**	Batch ID: **R105116**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190715A**	Analysis Date: **7/15/2019 12:08:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.00495	0.00500	0.00500	0	98.9	70	130			
Lithium	0.00992	0.0100	0.0100	0	99.2	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

August 20, 2019

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

Order No.: 1908174

RE: Luminant-A1 Area

Dear Will Vienne:

DHL Analytical, Inc. received 2 sample(s) on 8/16/2019 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

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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

№ 85327

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: 8-14-19 PAGE 1 OF 1
PO #: 1912226.2-C DHL WORK ORDER #: 1908174
PROJECT LOCATION OR NAME: LUMINANT - A1 AREA
CLENT PROJECT #: 1912226.2-C COLLECTOR: J. BRAYTON

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

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

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES: COBALT LITHIUM	FIELD NOTES
A1-2-OB	01	8-14-19	1100		P	1		X				XX	
A1-17-SPOIL	02	8-14-19	1205		P	1		X				XX	

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 PCB ☐ 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ 8321 HERB ☐ TPHOS, 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 ☐

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	8-15-19 1730	FedEx
FedEx	8/16/19 0943	[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 ☐ Per Will 8/16/19
~~NORMAL~~ X
OTHER ☐ _____

LABORATORY USE ONLY:
RECEIVING TEMP: 1.4°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

ORIGIN ID:FWHA (512) 671-3434
JIBRAYTON
GOLDER
2201 DOUBLE CREECK DR

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 15AUG19
ACTWGT: 18.30 LB
CAD: 6995323/SSFD2002
DIMS: 13x15x10 IN

BILL THIRD PARTY

Part # 155227-[illegible] 8/19

TO **DHL ANALYTICAL**
DHL ANALYTICAL
2300 DOUBLE CREEK DR

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

FedEx Express

J19200510201uv

TRK# 0201 **7891 6544 7941**

FRI - 16 AUG 10:30A
PRIORITY OVERNIGHT

A8 BSMA

78664
TX-US **AUS**

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Golder

Date Received: 8/16/2019

Work Order Number 1908174

Received by

Checklist completed by: _____ 8/16/2019 Reviewed by JD 8/16/2019
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 ☐	1.4 °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-A1 Area	**LRC Date:** 8/20/2019
Reviewer Name: Angie O'Donnell	**Laboratory Work Order: 1908174**
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-A1 Area	**LRC Date:** 8/20/2019
Reviewer Name: Angie O'Donnell	**Laboratory Work Order: 1908174**
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

08/20/19
Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *20-Aug-19*

CLIENT: Golder
Project: Luminant-A1 Area
Lab Order: 1908174

CASE NARRATIVE

Samples were analyzed using the following references:

Method SW6020A - Metals Analysis

Exception Report R1-01

The samples were received and log-in performed on 8/16/2019. A total of 2 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 Lithium for the Matrix Spike and Matrix Spike Duplicate (1908175-03 MS/MSD) was outside of 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.

DHL Analytical, Inc.

Date: *20-Aug-19*

CLIENT: Golder
Project: Luminant-A1 Area
Lab Order: 1908174

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1908174-01	A1-2-OB		08/14/19 11:00 AM	8/16/2019
1908174-02	A1-17-Spoil		08/14/19 12:05 PM	8/16/2019

Lab Order: 1908174
Client: Golder
Project: Luminant-A1 Area

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1908174-01A	A1-2-OB	08/14/19 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/19/19 08:43 AM	92407
1908174-02A	A1-17-Spoil	08/14/19 12:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	08/19/19 08:43 AM	92407

Lab Order: 1908174
Client: Golder
Project: Luminant-A1 Area

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1908174-01A	A1-2-OB	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92407	1	08/20/19 11:17 AM	ICP-MS5_190820A
1908174-02A	A1-17-Spoil	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92407	1	08/20/19 11:19 AM	ICP-MS5_190820A

DHL Analytical, Inc.

Date: *20-Aug-19*

CLIENT:	Golder	**Client Sample ID:**	A1-2-OB
Project:	Luminant-A1 Area	**Lab ID:**	1908174-01
Project No:	19122262-C	**Collection Date:**	08/14/19 11:00 AM
Lab Order:	1908174	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	08/20/19 11:17 AM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	08/20/19 11:17 AM

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: *20-Aug-19*

CLIENT:	Golder	**Client Sample ID:**	A1-17-Spoil
Project:	Luminant-A1 Area	**Lab ID:**	1908174-02
Project No:	19122262-C	**Collection Date:**	08/14/19 12:05 PM
Lab Order:	1908174	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	08/20/19 11:19 AM
Lithium	0.0394	0.00500	0.0100		mg/L	1	08/20/19 11:19 AM

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: 1908174
Project: Luminant-A1 Area

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190621A

Sample ID **DCS3-91398**	Batch ID: **91398**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **DCS3**	Run ID: **ICP-MS5_190621A**	Analysis Date: **6/21/2019 11:16:00 AM**	Prep Date: **6/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.00516	0.00500	0.00500	0	103	70	130	0	0	
Lithium	0.00535	0.0100	0.00500	0	107	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: 1908174
Project: Luminant-A1 Area

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190820A**

The QC data in batch 92407 applies to the following samples: 1908174-01A, 1908174-02A

Sample ID	**MB-92407**	Batch ID:	**92407**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS5_190820A**	Analysis Date:	**8/20/2019 11:00:00 AM**	Prep Date:	**8/19/2019**

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

Sample ID	**LCS-92407**	Batch ID:	**92407**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS5_190820A**	Analysis Date:	**8/20/2019 11:03:00 AM**	Prep Date:	**8/19/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.194	0.00500	0.200	0	97.1	80	120			
Lithium	0.201	0.0100	0.200	0	100	80	120			

Sample ID	**LCSD-92407**	Batch ID:	**92407**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS5_190820A**	Analysis Date:	**8/20/2019 11:05:00 AM**	Prep Date:	**8/19/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.191	0.00500	0.200	0	95.5	80	120	1.60	15	
Lithium	0.201	0.0100	0.200	0	101	80	120	0.137	15	

Sample ID	**1908175-03A SD**	Batch ID:	**92407**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS5_190820A**	Analysis Date:	**8/20/2019 11:12:00 AM**	Prep Date:	**8/19/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.101	0.0250	0	0.0985				2.91	10	
Lithium	1.17	0.0500	0	1.10				6.21	10	

Sample ID	**1908175-03A PDS**	Batch ID:	**92407**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS5_190820A**	Analysis Date:	**8/20/2019 11:26:00 AM**	Prep Date:	**8/19/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.270	0.00500	0.200	0.0985	85.9	80	120			
Lithium	1.29	0.0100	0.200	1.10	94.0	80	120			

Sample ID	**1908175-03A MS**	Batch ID:	**92407**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS5_190820A**	Analysis Date:	**8/20/2019 11:28:00 AM**	Prep Date:	**8/19/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.274	0.00500	0.200	0.0985	87.5	80	120			
Lithium	1.36	0.0100	0.200	1.10	131	80	120			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: 1908174
Project: Luminant-A1 Area

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190820A

Sample ID **1908175-03A MSD** Batch ID: **92407** TestNo: **SW6020A** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS5_190820A** Analysis Date: **8/20/2019 11:30:00 AM** Prep Date: **8/19/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.263	0.00500	0.200	0.0985	82.5	80	120	3.78	15	
Lithium	1.24	0.0100	0.200	1.10	71.2	80	120	9.15	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: 1908174
Project: Luminant-A1 Area

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190820A

Sample ID **ICV-190820**	Batch ID: **R105890**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_190820A**	Analysis Date: **8/20/2019 10:46:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.0990	0.00500	0.100	0	99.0	90	110			
Lithium	0.106	0.0100	0.100	0	106	90	110			

Sample ID **LCVL-190820**	Batch ID: **R105890**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190820A**	Analysis Date: **8/20/2019 10:54:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.00494	0.00500	0.00500	0	98.7	70	130			
Lithium	0.0107	0.0100	0.0100	0	107	70	130			

Sample ID **CCV1-190820**	Batch ID: **R105890**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190820A**	Analysis Date: **8/20/2019 11:41:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.198	0.00500	0.200	0	98.9	90	110			
Lithium	0.215	0.0100	0.200	0	108	90	110			

Sample ID **LCVL1-190820**	Batch ID: **R105890**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190820A**	Analysis Date: **8/20/2019 11:50:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.00510	0.00500	0.00500	0	102	70	130			
Lithium	0.0122	0.0100	0.0100	0	122	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

DHL Analytical, Inc.

Date: *20-Aug-19*

CLIENT: Golder
Work Order: 1908174
Project: Luminant-A1 Area

MQL SUMMARY REPORT

TestNo: SW6020A	MDL	MQL
Analyte	**mg/L**	**mg/L**
Cobalt	0.00300	0.00500
Lithium	0.00500	0.0100

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

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*Golder Associates - Will Vienne*
Project Number/ LIMS No.	*17431-01 / MI7013-JUN19*
Batch:	*Martin Lake A1 Area Landfill*
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:

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



Ben Eaton
Junior Mineralogist



Lain Glossop H.B.Sc
Senior Mineralogist

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Member of the SGS Group (SGS SA)

Method Summary

Mineral Identification and Interpretation:

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

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

Quantitative Rietveld Analysis:

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

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

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

Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

Quantitative X-ray Diffraction Results

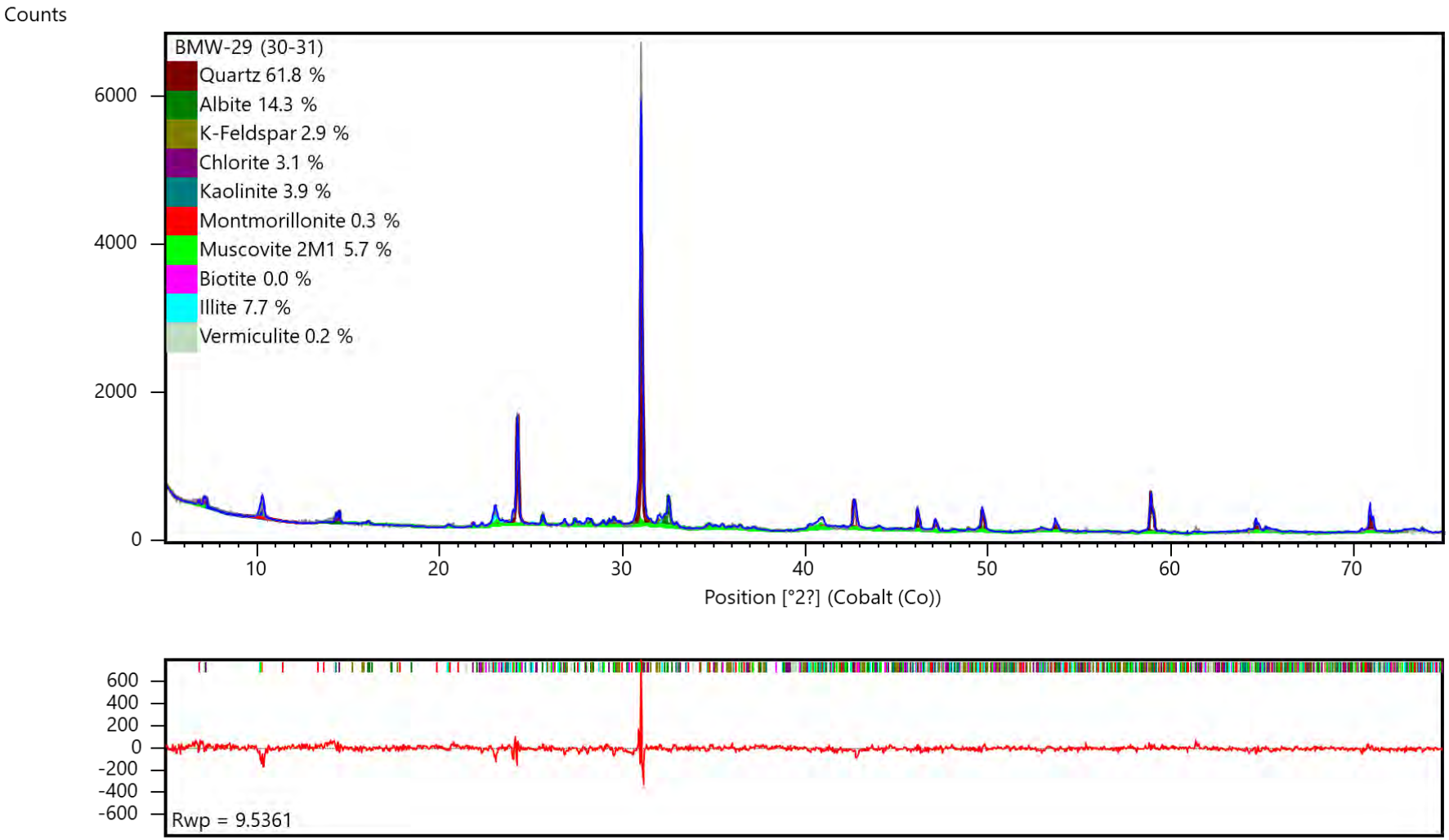
Mineral/Compound	1 BMW-29 (30-31)	2 BMW-30 (40-41)	3 BMW-31 (14-15)	4 BMW-32 (25-26)	5 BMW-33 (38-39)
	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)
Quartz	61.8	82.3	90.3	81.7	68.0
Albite	14.3	0.0	2.1	6.6	17.1
K-Feldspar	2.9	7.3	5.6	7.6	3.0
Chlorite	3.1	1.6	0.1	0.0	1.7
*Kaolinite	3.9	3.9	0.0	2.5	3.4
*Montmorillonite	0.3	0.0	0.1	0.0	0.6
Muscovite	5.7	1.5	0.7	0.8	4.0
Biotite	0.0	0.0	0.0	0.0	0.0
Illite	7.7	2.1	1.0	0.6	2.1
*Vermiculite	0.2	0.0	0.1	0.1	0.2
Titanomagnetite	--	0.2	--	--	--
Ilmenite	--	1.0	--	--	--
TOTAL	100	100	100	100	100

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

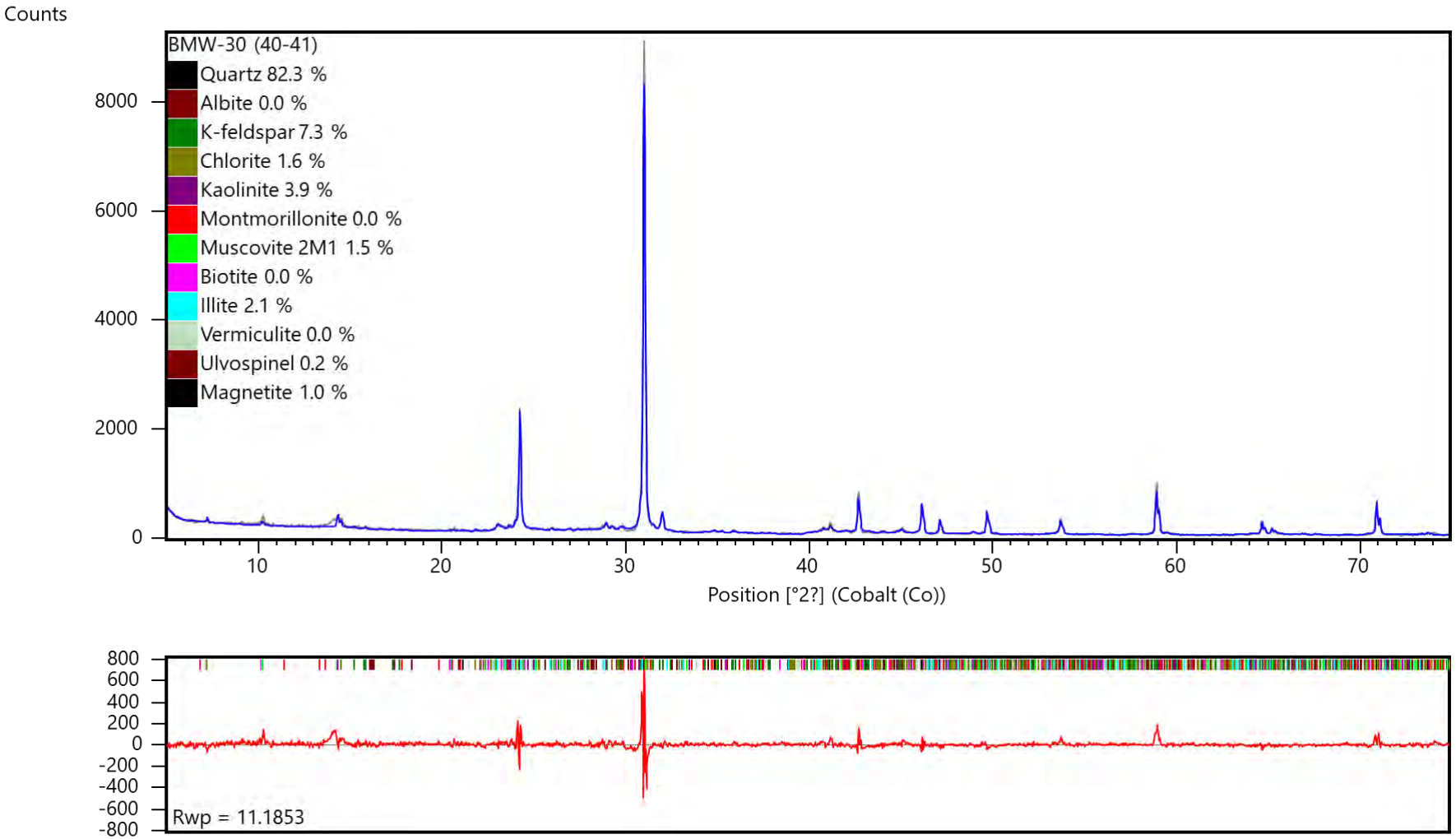
Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

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

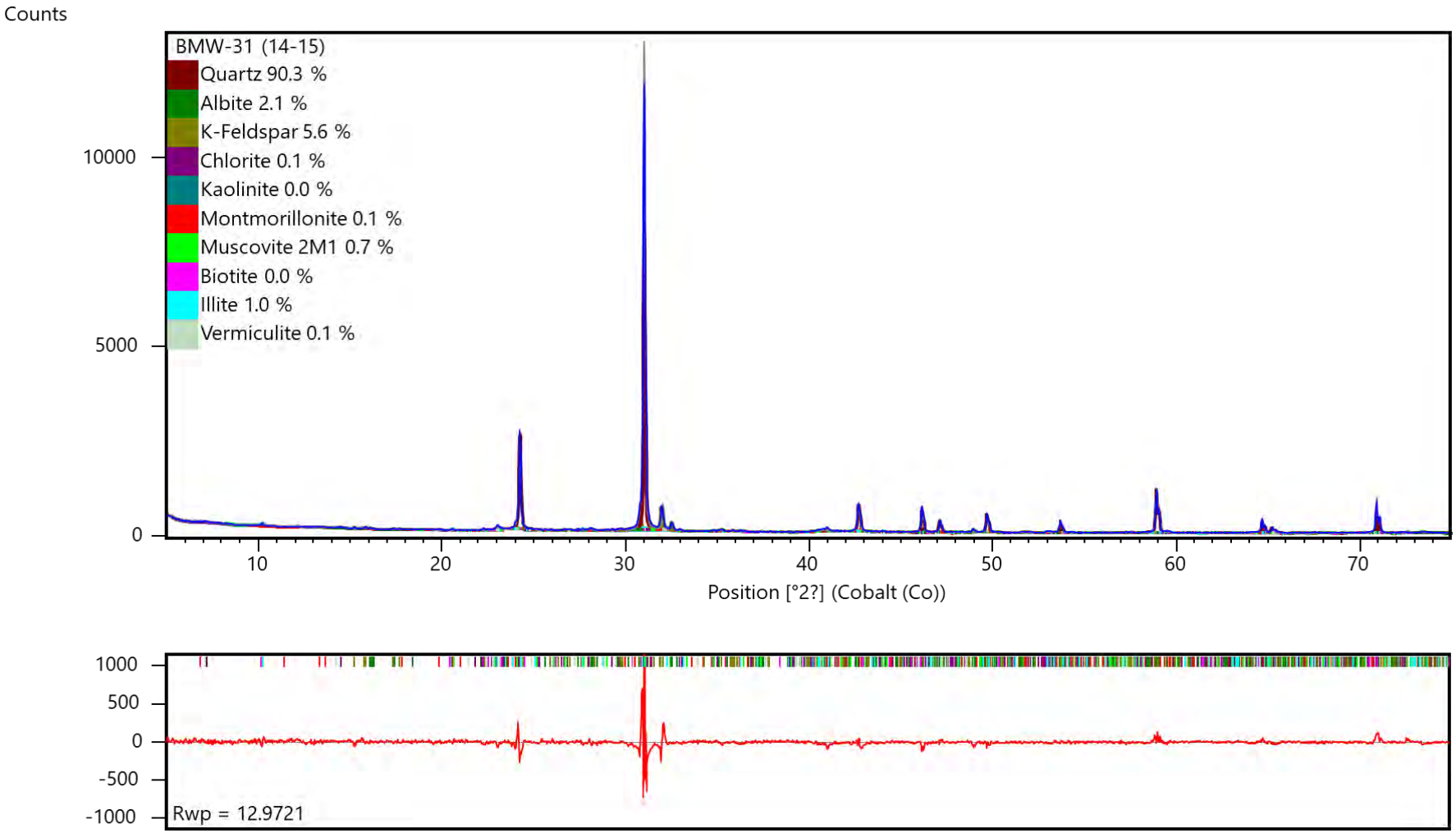
Mineral/Compound	Formula
Quartz	SiO_2
Albite	$NaAlSi_3O_8$
K-Feldspar	$KAlSi_3O_8$
Chlorite	$(Mg_3,Fe_2)Al(AlSi_3)O_{10}(OH)_8$
Kaolinite	$Al_2Si_2O_5(OH)_4$
Montmorillonite	$Na_{0.2}Ca_{0.1}Al_{1.5}Mg_{0.5}Si_4O_{10}(OH)_2 \cdot 4(H_2O)$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Biotite	$KMg_{2.5}Fe_{0.5}AlSi_3O_{10}(OH)_{1.75}F_{0.25}$
Illite	$(K,H_3O)(Al,Mg,Fe)_2(Si,Al)_4O_{10}[(OH)_2,(H_2O)]$
Vermiculite	$(Mg,Fe,Al)_2(Al,Si)_4O_{10}(OH)_2 \cdot 4(H_2O)$
Titanomagnetite	Fe_2TiO_4
Magnetite	Fe_2O_4



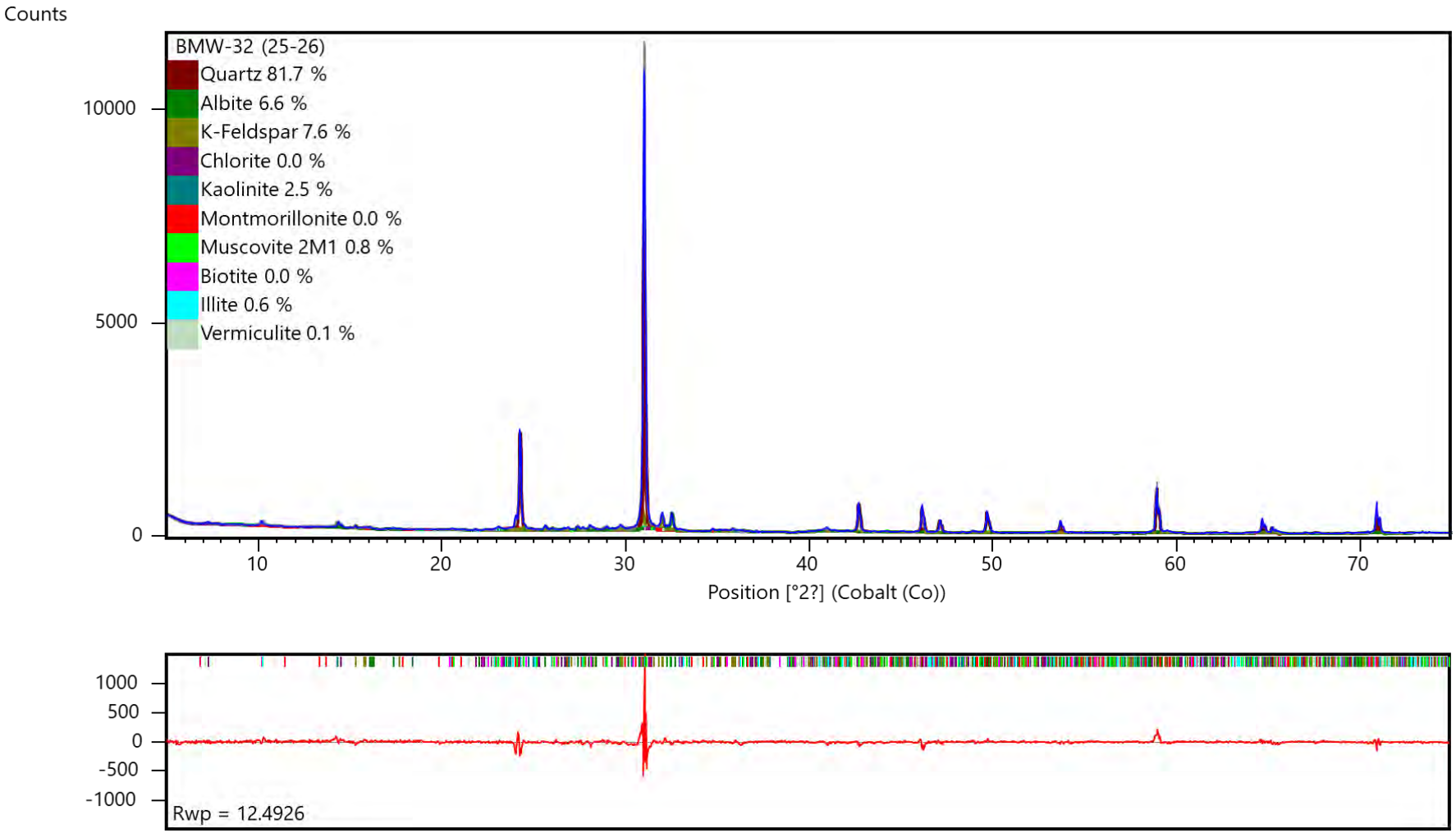
X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement and the lower red curve is the difference plot.



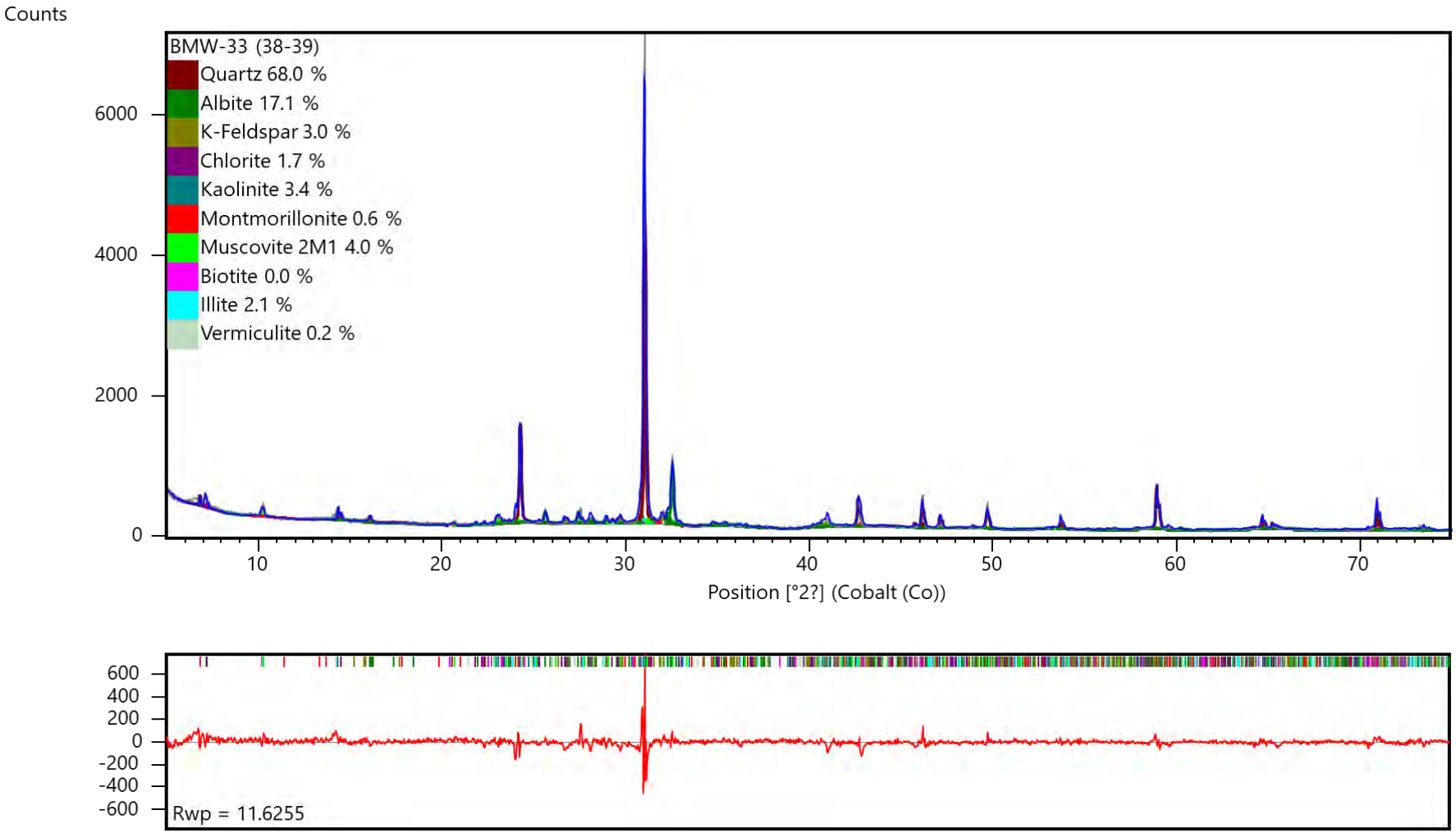
X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement and the lower red curve is the difference plot.



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.



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.

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.: 1905186

RE: Luminant-A1 Landfill

Dear Will Vienne:

DHL Analytical, Inc. received 1 sample(s) on 5/16/2019 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

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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

№ 82166 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: 5-15-19 PAGE 1 OF 1
PO #: DHL WORK ORDER #: 1905186
PROJECT LOCATION OR NAME: LUMINANT - AI LANDFILL
CLENT PROJECT #: 19122262-D COLLECTOR: J. BRAYTON

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

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

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

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ | VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ 8270 PCB ☐ | 8270 O-P PEST ☐ 8082 PCB ☐ T PHOS, AMMONIA ☐ | 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, NO$_3$, PO$_4$, Na, Mg, K FERROUS AND FERRIC IRON

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES	FIELD NOTES
S-1	01	5-15-19	1630	W		7						X X X	

RELINQUISHED BY: (Signature) DATE/TIME 5-16-19 9:15 RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME 5-16-19 11:21 RECEIVED BY: (Signature)

☐ DHL DISPOSAL @ $5.00 each ☐ Return 3

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

LABORATORY USE ONLY:
RECEIVING TEMP: 1.3/0.4/1.0/2.0 °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

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Golder | Date Received: 5/16/2019

Work Order Number 1905186 | Received by EL

Checklist completed by: _____ 5/16/2019 (Signature / Date) | Reviewed by: PB 5/16/2019 (Initials / Date)

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☑ EL 5/16/19	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 ☐	1.3 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 11837
	Adjusted? no		Checked by EL
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted?		Checked by

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

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

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

CLIENT: Golder
Project: Luminant-A1 Landfill
Lab Order: 1905186

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 sample was received and log-in performed on 5/16/19. A total of 1 sample was received. The sample arrived in good condition and was 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 and 5/21/19 LCVL6-190520 and LCVL-190521 were out of control limits for Sodium or Potassium. These are flagged accordingly. The associated CCVs were within control limits for these analytes. No further corrective actions were taken.

ANIONS ANALYSIS

For Anions analysis performed on 5/17/19 (batch 90964) the matrix spike duplicate recovery was slightly above control limits for Chloride. This was due to matrix effect. This is 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.

DHL Analytical, Inc.

Date: *30-May-19*

CLIENT: Golder
Project: Luminant-A1 Landfill
Lab Order: 1905186

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1905186-01	S-1		05/15/19 04:30 PM	5/16/2019

Lab Order: 1905186
Client: Golder
Project: Luminant-A1 Landfill

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905186-01A	S-1	05/15/19 04:30 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
	S-1	05/15/19 04:30 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
	S-1	05/15/19 04:30 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
1905186-01B	S-1	05/15/19 04:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	S-1	05/15/19 04:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	S-1	05/15/19 04:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	S-1	05/15/19 04:30 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:25 AM	91059
1905186-01C	S-1	05/15/19 04:30 PM	Aqueous	M2320 B	Alkalinity Preparation	05/17/19 09:00 AM	90967
	S-1	05/15/19 04:30 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90964
	S-1	05/15/19 04:30 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	S-1	05/15/19 04:30 PM	Aqueous	E300	Anion Preparation	05/16/19 01:49 PM	90934
	S-1	05/15/19 04:30 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/16/19 02:09 PM	90950
	S-1	05/15/19 04:30 PM	Aqueous	M2540C	TDS Preparation	05/20/19 12:59 PM	91001

Lab Order: 1905186
Client: Golder
Project: Luminant-A1 Landfill

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905186-01A	S-1	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91028	1	05/28/19	UV/VIS_2_190528B
	S-1	Aqueous	M3500-Fe D	Ferrous Iron	91028	50	05/21/19 05:59 PM	UV/VIS_2_190521B
	S-1	Aqueous	M3500-Fe D	Ferrous Iron	91028	20	05/21/19 05:52 PM	UV/VIS_2_190521B
	S-1	Aqueous	M3500-Fe D	Ferrous Iron	91028	1	05/21/19 05:41 PM	UV/VIS_2_190521B
1905186-01B	S-1	Aqueous	SW7470A	Mercury Total: Aqueous	91059	1	05/24/19 10:09 AM	CETAC2_HG_190524A
	S-1	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/23/19 02:35 PM	ICP-MS5_190523A
	S-1	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	100	05/21/19 01:58 PM	ICP-MS5_190521A
	S-1	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/20/19 04:29 PM	ICP-MS4_190520B
1905186-01C	S-1	Aqueous	M2320 B	Alkalinity	90967	1	05/17/19 05:29 PM	TITRATOR_190517A
	S-1	Aqueous	E300	Anions by IC method - Water	90964	100	05/17/19 04:41 PM	IC2_190517B
	S-1	Aqueous	E300	Anions by IC method - Water	90934	10	05/17/19 05:13 AM	IC2_190516B
	S-1	Aqueous	E300	Anions by IC method - Water	90934	1	05/16/19 10:17 PM	IC2_190516B
	S-1	Aqueous	M4500-P E	Orthophosphate	90950	1	05/16/19 02:52 PM	UV/VIS_2_190516B
	S-1	Aqueous	M2540C	Total Dissolved Solids	91001	1	05/20/19 04:45 PM	WC_190520A

DHL Analytical, Inc.

Date: *30-May-19*

CLIENT:	Golder	**Client Sample ID:**	S-1
Project:	Luminant-A1 Landfill	**Lab ID:**	1905186-01
Project No:	19122262-D	**Collection Date:**	05/15/19 04:30 PM
Lab Order:	1905186	**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 04:29 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/20/19 04:29 PM
Barium	0.0191	0.00300	0.0100		mg/L	1	05/20/19 04:29 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/20/19 04:29 PM
Boron	30.7	1.00	3.00		mg/L	100	05/21/19 01:58 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/20/19 04:29 PM
Calcium	521	10.0	30.0		mg/L	100	05/21/19 01:58 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/20/19 04:29 PM
Cobalt	0.0388	0.00300	0.00500		mg/L	1	05/20/19 04:29 PM
Iron	16.6	3.00	10.0		mg/L	100	05/21/19 01:58 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/20/19 04:29 PM
Lithium	0.0161	0.00500	0.0100		mg/L	1	05/20/19 04:29 PM
Magnesium	121	10.0	30.0		mg/L	100	05/21/19 01:58 PM
Molybdenum	0.276	0.00200	0.00500		mg/L	1	05/23/19 02:35 PM
Potassium	35.5	10.0	30.0		mg/L	100	05/21/19 01:58 PM
Selenium	0.0441	0.00200	0.00500		mg/L	1	05/20/19 04:29 PM
Sodium	534	10.0	30.0		mg/L	100	05/21/19 01:58 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/19 04:29 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 10:09 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	814	30.0	100		mg/L	100	05/17/19 04:41 PM
Fluoride	0.447	0.100	0.400		mg/L	1	05/16/19 10:17 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/16/19 10:17 PM
Sulfate	1770	100	300		mg/L	100	05/17/19 04:41 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	155	10.0	20.0		mg/L @ pH 4.52	1	05/17/19 05:29 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/17/19 05:29 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/17/19 05:29 PM
Alkalinity, Total (As CaCO3)	155	20.0	20.0		mg/L @ pH 4.52	1	05/17/19 05:29 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	6.10	0.0500	0.100	N	mg/L	1	05/28/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	10.5	2.50	5.00	N	mg/L	50	05/21/19 05:59 PM

Qualifiers:

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

DHL Analytical, Inc.

Date: *30-May-19*

CLIENT:	Golder	**Client Sample ID:**	S-1
Project:	Luminant-A1 Landfill	**Lab ID:**	1905186-01
Project No:	19122262-D	**Collection Date:**	05/15/19 04:30 PM
Lab Order:	1905186	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.0450	0.0300	0.100	J	mg/L	1	05/16/19 02:52 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	4220	50.0	50.0		mg/L	1	05/20/19 04:45 PM

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

CLIENT: Golder
Work Order: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_190524A

The QC data in batch 91059 applies to the following samples: 1905186-01B

Sample ID	**MB-91059**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 9:28:33 AM**	Prep Date:	**5/23/2019**

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

Sample ID	**LCS-91059**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 9:33:05 AM**	Prep Date:	**5/23/2019**

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-91059**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 9:35:22 AM**	Prep Date:	**5/23/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00195	0.000200	0.00200	0	97.5	85	115	4.19	15	

Sample ID	**1905231-01A MS**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 10:20:46 AM**	Prep Date:	**5/23/2019**

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			

Sample ID	**1905231-01A MSD**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 10:23:02 AM**	Prep Date:	**5/23/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00925	0.00100	0.0100	0	92.5	80	120	3.71	15	

Sample ID	**1905231-01A SD**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 10:25:18 AM**	Prep Date:	**5/23/2019**

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

Sample ID	**1905231-01A PDS**	Batch ID:	**91059**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 10:27:34 AM**	Prep Date:	**5/23/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0120	0.00100	0.0125	0	95.6	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_190524A

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

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

Sample ID	**CCV1-190524**	Batch ID:	**R104261**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 10:00:18 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00214	0.000200	0.00200	0	107	90	110			

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

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

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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190520B**

The QC data in batch 90959 applies to the following samples: 1905186-01B

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: 1905186
Project: Luminant-A1 Landfill

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: 1905186
Project: Luminant-A1 Landfill

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
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: 1905186
Project: Luminant-A1 Landfill

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: 1905186
Project: Luminant-A1 Landfill

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: 1905186
Project: Luminant-A1 Landfill

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: 1905186
Project: Luminant-A1 Landfill

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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190520B

Sample ID **CCV7-190520**	Batch ID: **R104182**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190520B**	Analysis Date: **5/20/2019 4:30:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.192	0.00250	0.200	0	96.1	90	110			
Arsenic	0.202	0.00500	0.200	0	101	90	110			
Barium	0.194	0.0100	0.200	0	97.2	90	110			
Beryllium	0.196	0.00100	0.200	0	97.9	90	110			
Cadmium	0.193	0.00100	0.200	0	96.5	90	110			
Chromium	0.194	0.00500	0.200	0	96.8	90	110			
Cobalt	0.199	0.00500	0.200	0	99.3	90	110			
Lead	0.190	0.00100	0.200	0	95.2	90	110			
Lithium	0.202	0.0100	0.200	0	101	90	110			
Selenium	0.203	0.00500	0.200	0	101	90	110			
Thallium	0.200	0.00150	0.200	0	99.8	90	110			

Sample ID **LCVL7-190520**	Batch ID: **R104182**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190520B**	Analysis Date: **5/20/2019 4:36:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00173	0.00250	0.00200	0	86.3	70	130			
Arsenic	0.00485	0.00500	0.00500	0	97.0	70	130			
Barium	0.00429	0.0100	0.00500	0	85.7	70	130			
Beryllium	0.00105	0.00100	0.00100	0	105	70	130			
Cadmium	0.000850	0.00100	0.00100	0	85.0	70	130			
Chromium	0.00476	0.00500	0.00500	0	95.2	70	130			
Cobalt	0.00485	0.00500	0.00500	0	97.0	70	130			
Lead	0.000798	0.00100	0.00100	0	79.8	70	130			
Lithium	0.0115	0.0100	0.0100	0	115	70	130			
Selenium	0.00474	0.00500	0.00500	0	94.8	70	130			
Thallium	0.000788	0.00150	0.00100	0	78.8	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

The QC data in batch 90959 applies to the following samples: 1905186-01B

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: 1905186
Project: Luminant-A1 Landfill

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: 1905186
Project: Luminant-A1 Landfill

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			
Potassium	2.38	0.300	2.50	0	95.3	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			
Potassium	0.0691	0.300	0.100	0	69.1	70	130			S
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			
Potassium	4.74	0.300	5.00	0	94.7	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			

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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190521A

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
Potassium	0.0845	0.300	0.100	0	84.5	70	130			
Sodium	0.0986	0.300	0.100	0	98.6	70	130			

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			
Calcium	5.13	0.300	5.00	0	103	90	110			
Iron	5.25	0.100	5.00	0	105	90	110			
Magnesium	5.17	0.300	5.00	0	103	90	110			
Molybdenum	0.201	0.00500	0.200	0	101	90	110			
Potassium	4.97	0.300	5.00	0	99.4	90	110			
Sodium	5.14	0.300	5.00	0	103	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			
Calcium	0.102	0.300	0.100	0	102	70	130			
Iron	0.101	0.100	0.100	0	101	70	130			
Magnesium	0.0962	0.300	0.100	0	96.2	70	130			
Molybdenum	0.00474	0.00500	0.00500	0	94.7	70	130			
Potassium	0.0844	0.300	0.100	0	84.4	70	130			
Sodium	0.105	0.300	0.100	0	105	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190523A

Sample ID **ICV-190523**	Batch ID: **R104250**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_190523A**	Analysis Date: **5/23/2019 12:59:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.0950	0.00500	0.100	0	95.0	90	110			

Sample ID **LCVL-190523**	Batch ID: **R104250**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190523A**	Analysis Date: **5/23/2019 1:03:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.00493	0.00500	0.00500	0	98.6	70	130			

Sample ID **CCV1-190523**	Batch ID: **R104250**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190523A**	Analysis Date: **5/23/2019 1:56:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.200	0.00500	0.200	0	100	90	110			

Sample ID **LCVL1-190523**	Batch ID: **R104250**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190523A**	Analysis Date: **5/23/2019 2:10:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.00501	0.00500	0.00500	0	100	70	130			

Sample ID **CCV2-190523**	Batch ID: **R104250**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190523A**	Analysis Date: **5/23/2019 2:42:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.199	0.00500	0.200	0	99.6	90	110			

Sample ID **LCVL2-190523**	Batch ID: **R104250**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190523A**	Analysis Date: **5/23/2019 3:00:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.00479	0.00500	0.00500	0	95.7	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190516B

The QC data in batch 90934 applies to the following samples: 1905186-01C

Sample ID	**MB-90934**	Batch ID:	**90934**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_190516B**	Analysis Date:	**5/16/2019 10:26:41 AM**	Prep Date:	**5/16/2019**

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-90934**	Batch ID:	**90934**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_190516B**	Analysis Date:	**5/16/2019 10:42:42 AM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.08	0.400	4.000	0	102	90	110			
Nitrate-N	5.10	0.500	5.000	0	102	90	110			

Sample ID	**LCSD-90934**	Batch ID:	**90934**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_190516B**	Analysis Date:	**5/16/2019 10:58:41 AM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.08	0.400	4.000	0	102	90	110	0.128	20	
Nitrate-N	5.18	0.500	5.000	0	104	90	110	1.47	20	

Sample ID	**1905178-02DMS**	Batch ID:	**90934**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190516B**	Analysis Date:	**5/16/2019 12:59:35 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	21400	400	20000	0	107	90	110			
Nitrate-N	4620	500	4516	0	102	90	110			

Sample ID	**1905178-02DMSD**	Batch ID:	**90934**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190516B**	Analysis Date:	**5/16/2019 1:15:35 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	21000	400	20000	0	105	90	110	1.92	20	
Nitrate-N	4530	500	4516	0	100	90	110	2.06	20	

Sample ID	**1905178-03DMS**	Batch ID:	**90934**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190516B**	Analysis Date:	**5/16/2019 1:47:35 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	21100	400	20000	0	106	90	110			
Nitrate-N	4600	500	4516	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190516B

Sample ID **1905178-03DMSD**	Batch ID: **90934**	TestNo: **E300**	Units: **mg/L**		
SampType: **MSD**	Run ID: **IC2_190516B**	Analysis Date: **5/16/2019 2:03:35 PM**	Prep Date: **5/16/2019**		

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	21100	400	20000	0	106	90	110	0.221	20	
Nitrate-N	4550	500	4516	0	101	90	110	1.04	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190516B

Sample ID **ICV-190516**	Batch ID: **R104123**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_190516B**	Analysis Date: **5/16/2019 9:54:41 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	10.5	0.400	10.00	0	105	90	110			
Nitrate-N	13.3	0.500	12.50	0	106	90	110			

Sample ID **CCV1-190516**	Batch ID: **R104123**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190516B**	Analysis Date: **5/16/2019 5:29:14 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.18	0.400	4.000	0	104	90	110			
Nitrate-N	5.22	0.500	5.000	0	104	90	110			

Sample ID **CCV2-190516**	Batch ID: **R104123**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190516B**	Analysis Date: **5/16/2019 9:29:14 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.18	0.400	4.000	0	105	90	110			
Nitrate-N	5.22	0.500	5.000	0	104	90	110			

Sample ID **CCV3-190516**	Batch ID: **R104123**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190516B**	Analysis Date: **5/17/2019 12:41:14 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.24	0.400	4.000	0	106	90	110			
Nitrate-N	5.27	0.500	5.000	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190517B

The QC data in batch 90964 applies to the following samples: 1905186-01C

Sample ID	**MB-90964**	Batch ID:	**90964**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_190517B**	Analysis Date:	**5/17/2019 10:29:03 AM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Sulfate	<1.00	3.00								

Sample ID	**LCS-90964**	Batch ID:	**90964**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_190517B**	Analysis Date:	**5/17/2019 10:45:03 AM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.5	1.00	10.00	0	105	90	110			
Sulfate	31.5	3.00	30.00	0	105	90	110			

Sample ID	**LCSD-90964**	Batch ID:	**90964**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_190517B**	Analysis Date:	**5/17/2019 11:01:03 AM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.5	1.00	10.00	0	105	90	110	0.421	20	
Sulfate	31.6	3.00	30.00	0	105	90	110	0.320	20	

Sample ID	**1905169-06BMS**	Batch ID:	**90964**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190517B**	Analysis Date:	**5/17/2019 3:37:12 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	228	10.0	200.0	10.78	109	90	110			
Sulfate	388	30.0	200.0	177.5	105	90	110			

Sample ID	**1905169-06BMSD**	Batch ID:	**90964**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190517B**	Analysis Date:	**5/17/2019 3:53:11 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	234	10.0	200.0	10.78	112	90	110	2.69	20	S
Sulfate	394	30.0	200.0	177.5	108	90	110	1.58	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190517B

Sample ID **ICV-190517**	Batch ID: **R104148**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_190517B**	Analysis Date: **5/17/2019 9:57:03 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	26.8	1.00	25.00	0	107	90	110			
Sulfate	80.5	3.00	75.00	0	107	90	110			

Sample ID **CCV1-190517**	Batch ID: **R104148**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190517B**	Analysis Date: **5/17/2019 7:21:11 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.7	1.00	10.00	0	107	90	110			
Sulfate	31.9	3.00	30.00	0	106	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190517A

The QC data in batch 90967 applies to the following samples: 1905186-01C

Sample ID	MB-90967	Batch ID:	90967	TestNo:	M2320 B	Units:	mg/L @ pH 4.18
SampType:	MBLK	Run ID:	TITRATOR_190517A	Analysis Date:	5/17/2019 10:37:00 AM	Prep Date:	5/17/2019

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-90967	Batch ID:	90967	TestNo:	M2320 B	Units:	mg/L @ pH 4.07
SampType:	LCS	Run ID:	TITRATOR_190517A	Analysis Date:	5/17/2019 10:42:00 AM	Prep Date:	5/17/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	52.8	20.0	50.00	0	106	74	129			

Sample ID	LCSD-90967	Batch ID:	90967	TestNo:	M2320 B	Units:	mg/L @ pH 4.09
SampType:	LCSD	Run ID:	TITRATOR_190517A	Analysis Date:	5/17/2019 11:23:00 AM	Prep Date:	5/17/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	52.7	20.0	50.00	0	105	74	129	0.152	20	

Sample ID	1905178-02D DUP	Batch ID:	90967	TestNo:	M2320 B	Units:	mg/L @ pH 4.53
SampType:	DUP	Run ID:	TITRATOR_190517A	Analysis Date:	5/17/2019 12:39:00 PM	Prep Date:	5/17/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	460	20.0	0	469.5				2.04	20	
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	460	20.0	0	469.5				2.04	20	

Sample ID	1905185-03C DUP	Batch ID:	90967	TestNo:	M2320 B	Units:	mg/L @ pH 4.54
SampType:	DUP	Run ID:	TITRATOR_190517A	Analysis Date:	5/17/2019 2:20:00 PM	Prep Date:	5/17/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	469	20.0	0	473.7				1.06	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)	469	20.0	0	473.7				1.06	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190517A

Sample ID **ICV-190517**	Batch ID: **R104143**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.21**
SampType: **ICV**	Run ID: **TITRATOR_190517A**	Analysis Date: **5/17/2019 10:16:00 AM**	Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	10.2	20.0	0							
Alkalinity, Carbonate (As CaCO3)	88.2	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	98.3	20.0	100.0	0	98.3	98	102			

Sample ID **CCV1-190517**	Batch ID: **R104143**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.25**
SampType: **CCV**	Run ID: **TITRATOR_190517A**	Analysis Date: **5/17/2019 1:41:00 PM**	Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	25.5	20.0	0							
Alkalinity, Carbonate (As CaCO3)	73.1	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	98.6	20.0	100.0	0	98.6	90	110			

Sample ID **CCV2-190517**	Batch ID: **R104143**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.22**
SampType: **CCV**	Run ID: **TITRATOR_190517A**	Analysis Date: **5/17/2019 5:20:00 PM**	Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	14.9	20.0	0							
Alkalinity, Carbonate (As CaCO3)	84.2	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 **CCV3-190517**	Batch ID: **R104143**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.21**
SampType: **CCV**	Run ID: **TITRATOR_190517A**	Analysis Date: **5/17/2019 5:36:00 PM**	Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	16.4	20.0	0							
Alkalinity, Carbonate (As CaCO3)	82.2	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	98.6	20.0	100.0	0	98.6	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190516B

The QC data in batch 90950 applies to the following samples: 1905186-01C

Sample ID	**MB-90950**	Batch ID:	**90950**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**UV/VIS_2_190516B**	Analysis Date:	**5/16/2019 2:45:00 PM**	Prep Date:	**5/16/2019**

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

Sample ID	**LCS-90950**	Batch ID:	**90950**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**UV/VIS_2_190516B**	Analysis Date:	**5/16/2019 2:45:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.523	0.100	0.5000	0	105	80	120			

Sample ID	**LCSD-90950**	Batch ID:	**90950**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**UV/VIS_2_190516B**	Analysis Date:	**5/16/2019 2:46:00 PM**	Prep Date:	**5/16/2019**

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	5.30	15	

Sample ID	**1905185-01CMS**	Batch ID:	**90950**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**UV/VIS_2_190516B**	Analysis Date:	**5/16/2019 2:46:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.647	0.100	0.5000	0.05100	119	80	120			

Sample ID	**1905185-01CMSD**	Batch ID:	**90950**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**UV/VIS_2_190516B**	Analysis Date:	**5/16/2019 2:47:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.614	0.100	0.5000	0.05100	113	80	120	5.23	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190516B

Sample ID **ICV-190516**	Batch ID: **R104109**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_190516B**	Analysis Date: **5/16/2019 2:44:00 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 **CCV1-190516**	Batch ID: **R104109**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190516B**	Analysis Date: **5/16/2019 2:51:00 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			

Sample ID **CCV2-190516**	Batch ID: **R104109**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190516B**	Analysis Date: **5/16/2019 2:53:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.485	0.100	0.5000	0	97.0	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: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190521B

The QC data in batch 91028 applies to the following samples: 1905186-01A

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

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

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

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

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

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

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

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

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190521B

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

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

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

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

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

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1905186
Project: Luminant-A1 Landfill

ANALYTICAL QC SUMMARY REPORT

RunID: WC_190520A

The QC data in batch 91001 applies to the following samples: 1905186-01C

Sample ID	**MB-91001**	Batch ID:	**91001**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_190520A**	Analysis Date:	**5/20/2019 4:45:00 PM**	Prep Date:	**5/20/2019**

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-91001**	Batch ID:	**91001**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_190520A**	Analysis Date:	**5/20/2019 4:45:00 PM**	Prep Date:	**5/20/2019**

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	**1905182-01D-DUP**	Batch ID:	**91001**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190520A**	Analysis Date:	**5/20/2019 4:45:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	6840	200	0	6820				0.293	5	

Sample ID	**1905182-02D-DUP**	Batch ID:	**91001**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190520A**	Analysis Date:	**5/20/2019 4:45:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	5030	50.0	0	5065				0.693	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:	L1100939
Samples Received:	05/21/2019
Project Number:	1905186
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.

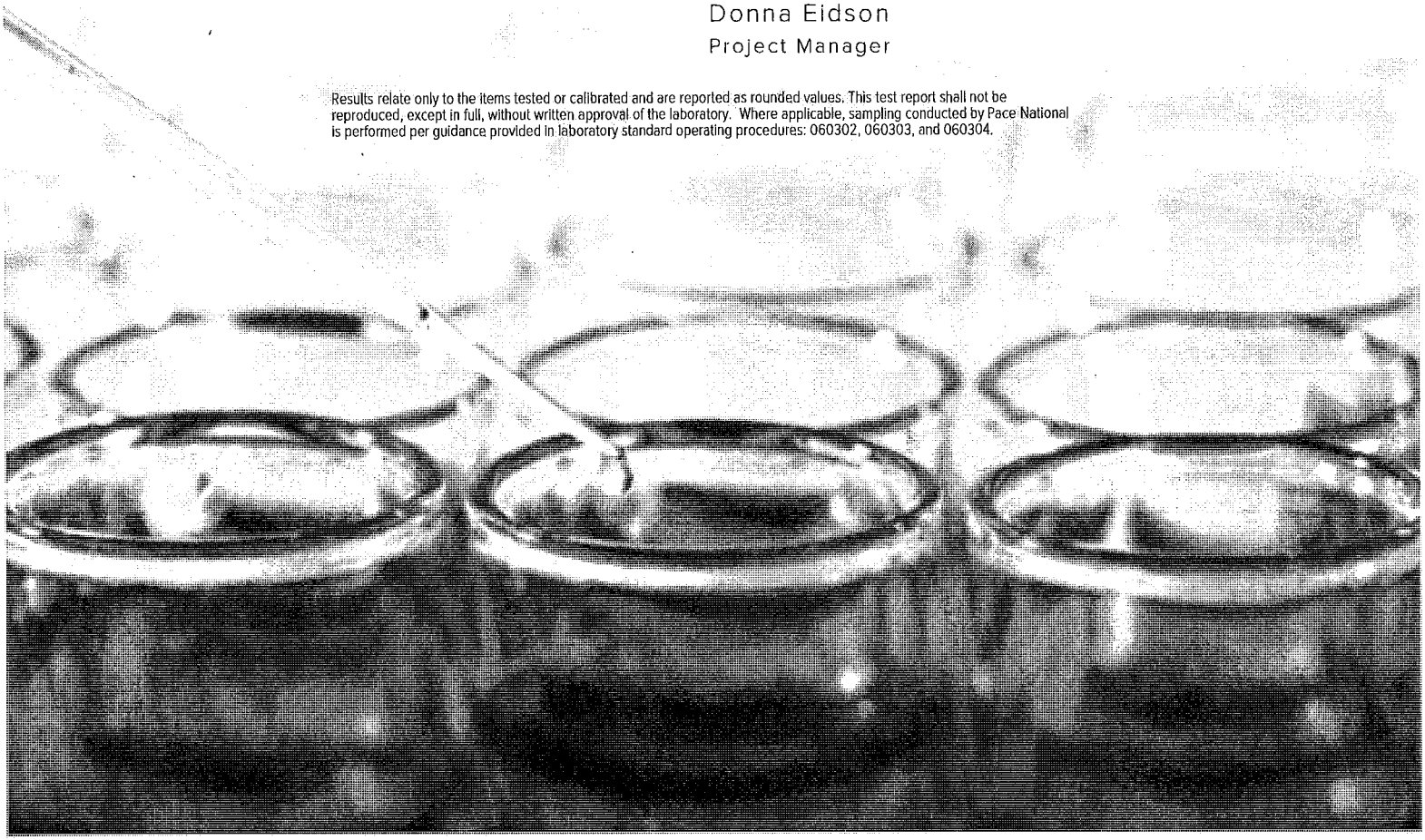


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	Collected by	Collected date/time	Received date/time
S-1 L1100939-01 Non-Potable Water		05/15/19 16:30	05/21/19 10:10

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	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	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	2.00		0.355	0.544	05/28/2019 10:55	WG1284744
(T) Barium	*111*			*62.0-143*	*05/28/2019 10:55*	WG1284744
(T) Yttrium	*112*			*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	2.78		0.703	0.765	05/28/2019 10:55	WG1284773
Combined Radium	2.78		0.703	0.765	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	0.780		0.348	0.221	05/24/2019 17:05	WG1284773
(T) Barium-133	*85.3*			*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	MB Qualifier	MB MDA
	pCi/l		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	DUP Result	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	pCi/l		%			%	
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	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
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	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	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	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

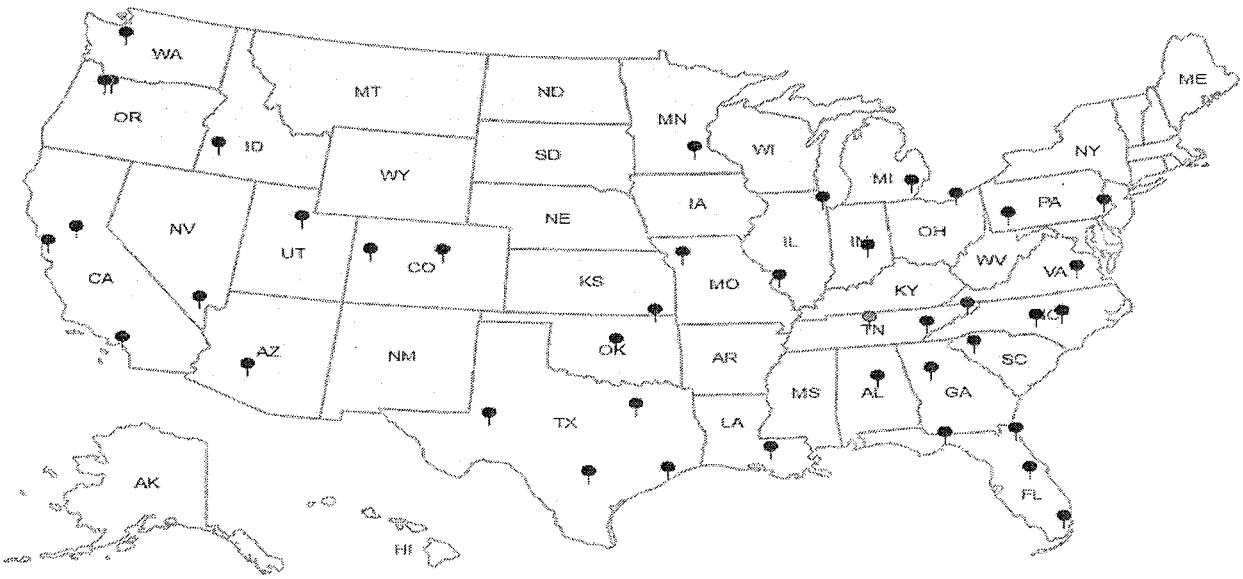
Third Party Federal Accreditations

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: DHLRRTX	SDG#:	1100939
Cooler Received/Opened On: 5/21/19	Temperature:	Amb
Received By: Brock Fariss		
Signature: BF Fariss		

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

1100939

CHAIN-OF-CUSTODY RECORD

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

H003

Work Order: 1905186

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

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

16-May-19

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Ra-228 E904.0	Ra-226 M7500 Ra B M	Requested Tests					
					<2	<2						
S-1	Aqueous	-01D	05/15/19 04:30 PM	1LHDPEHNO3		1						-01
S-1	Aqueous	-01E	05/15/19 04:30 PM	1LHDPEHNO3	1							01

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]	5/17/19 1760	Received by:	[signature] Fairm	5/21/19 0845/910
Relinquished by:			Received by:		

AWND RAD SCREEN: <0.5 mR/hr

eurofins | Environment Testing TestAmerica



ANALYTICAL REPORT

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

Laboratory Job ID: 140-15492-1
Client Project/Site: Martin Lake A1 Area LF SEP + Totals

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

Attn: Will Vienne

Terry Walker Wasmund

Authorized for release by:
7/18/2019 6:22:20 PM

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

LINKS

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Visit us at: www.testamericainc.com

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

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

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Definitions/Glossary

Client: Golder Associates Inc. Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF 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.
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: 140-15492-1

Laboratory: Eurofins TestAmerica, Knoxville

Narrative

Job Narrative
140-15492-1

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 1.4º 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: 140-15492-1 (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.

Samples BMW-29 (30-31) (140-15492-1), BMW-30 (40-41) (140-15492-2), BMW-31 (14-15) (140-15492-3), BMW-32 (25-26) (140-15492-4) and BMW-33 (38-39) (140-15492-5) 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 BMW-29 (30-31) (140-15492-1), BMW-30 (40-41) (140-15492-2), BMW-31 (14-15) (140-15492-3), BMW-32 (25-26) (140-15492-4) and BMW-33 (38-39) (140-15492-5) 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: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

Client Sample ID: BMW-29 (30-31)
Lab Sample ID: 140-15492-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	3.8	J	4.1	0.17	mg/Kg	4	☼	6010B SEP	Step 1
Aluminum	16	J *	41	6.5	mg/Kg	3	☼	6010B SEP	Step 2
Barium	1.1	J *	10	0.49	mg/Kg	3	☼	6010B SEP	Step 2
Cobalt	1.4	J	10	0.26	mg/Kg	3	☼	6010B SEP	Step 2
Iron	48	*	20	12	mg/Kg	3	☼	6010B SEP	Step 2
Manganese	35		3.1	1.1	mg/Kg	3	☼	6010B SEP	Step 2
Selenium	1.2	J B	2.0	0.69	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	170		14	2.9	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	1.4		0.68	0.18	mg/Kg	1	☼	6010B SEP	Step 3
Barium	4.3	B	3.4	0.16	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.11	J	0.34	0.020	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	1.5	J	3.4	0.061	mg/Kg	1	☼	6010B SEP	Step 3
Iron	4200		6.8	3.9	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	95	B	1.0	0.037	mg/Kg	1	☼	6010B SEP	Step 3
Mo	0.14	J	2.7	0.11	mg/Kg	1	☼	6010B SEP	Step 3
Selenium	0.28	J B	0.68	0.23	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	2600		14	2.2	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.87	B	0.68	0.30	mg/Kg	1	☼	6010B SEP	Step 4
Barium	19		3.4	0.16	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.23	J	0.34	0.022	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	3.2	J	3.4	0.072	mg/Kg	1	☼	6010B SEP	Step 4
Iron	8300		6.8	3.9	mg/Kg	1	☼	6010B SEP	Step 4
Li	6.7		3.4	0.20	mg/Kg	1	☼	6010B SEP	Step 4
Manganese	180		1.0	0.18	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	500	*	200	32	mg/Kg	5	☼	6010B SEP	Step 5
Barium	17	J *	51	2.4	mg/Kg	5	☼	6010B SEP	Step 5
Cobalt	1.0	J *	51	0.82	mg/Kg	5	☼	6010B SEP	Step 5
Iron	530	*	100	60	mg/Kg	5	☼	6010B SEP	Step 5
Manganese	33	*	15	2.5	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	3500		14	2.2	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	1.1		0.68	0.20	mg/Kg	1	☼	6010B SEP	Step 6
Barium	30		3.4	0.16	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.11	J	0.34	0.016	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	1.2	J	3.4	0.063	mg/Kg	1	☼	6010B SEP	Step 6
Iron	4800		6.8	3.9	mg/Kg	1	☼	6010B SEP	Step 6
Li	4.0		3.4	0.20	mg/Kg	1	☼	6010B SEP	Step 6
Manganese	38		1.0	0.34	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	34000		140	22	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	0.59	J	0.68	0.18	mg/Kg	1	☼	6010B SEP	Step 7
Barium	340		34	1.6	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.69		0.34	0.010	mg/Kg	1	☼	6010B SEP	Step 7
Cobalt	0.90	J	6.8	0.41	mg/Kg	2	☼	6010B SEP	Step 7
Iron	6700		6.8	5.6	mg/Kg	1	☼	6010B SEP	Step 7
Li	14		3.4	0.20	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	36		1.0	0.071	mg/Kg	1	☼	6010B SEP	Step 7
Mo	0.20	J	2.7	0.11	mg/Kg	1	☼	6010B SEP	Step 7
Thallium	0.74	J	4.8	0.49	mg/Kg	2	☼	6010B SEP	Step 7
Aluminum	41000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	4.0		0.50	0.13	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 A1 Area LF SEP + Totals

Job ID: 140-15492-1

Client Sample ID: BMW-29 (30-31) (Continued)

Lab Sample ID: 140-15492-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	410		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	1.1		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cobalt	9.2		2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	25000		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	25		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	420		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	0.33	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Selenium	1.5		0.50	0.17	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Thallium	0.74	J	1.8	0.18	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Boron	15	J	25	13	mg/Kg	1	☼	6010B	Total/NA
Chromium	19		1.9	0.28	mg/Kg	1	☼	6010B	Total/NA
Lead	9.7		1.9	0.35	mg/Kg	1	☼	6010B	Total/NA
Aluminum	72000		140	22	mg/Kg	10	☼	6010B	Total/NA
Arsenic	3.8		0.68	0.18	mg/Kg	1	☼	6010B	Total/NA
Barium	630		34	1.6	mg/Kg	10	☼	6010B	Total/NA
Beryllium	1.2		0.34	0.010	mg/Kg	1	☼	6010B	Total/NA
Cobalt	10	J	17	1.0	mg/Kg	5	☼	6010B	Total/NA
Iron	26000		6.8	5.6	mg/Kg	1	☼	6010B	Total/NA
Lithium	31		3.4	0.20	mg/Kg	1	☼	6010B	Total/NA
Manganese	490		1.0	0.071	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.70	J	2.7	0.11	mg/Kg	1	☼	6010B	Total/NA
Thallium	1.4	J	12	1.2	mg/Kg	5	☼	6010B	Total/NA
Hg	0.078	J	0.14	0.054	mg/Kg	1	☼	7470A	Total/NA

Client Sample ID: BMW-30 (40-41)

Lab Sample ID: 140-15492-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	0.82	J	12	0.21	mg/Kg	4	☼	6010B SEP	Step 1
Manganese	1.5	J	3.6	0.15	mg/Kg	4	☼	6010B SEP	Step 1
Aluminum	7.3	J *	36	5.7	mg/Kg	3	☼	6010B SEP	Step 2
Barium	0.52	J *	8.9	0.43	mg/Kg	3	☼	6010B SEP	Step 2
Cobalt	0.28	J	8.9	0.22	mg/Kg	3	☼	6010B SEP	Step 2
Iron	24	*	18	10	mg/Kg	3	☼	6010B SEP	Step 2
Selenium	0.67	J B	1.8	0.61	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	35		12	2.5	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	1.3		0.59	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Barium	2.0	J B	3.0	0.14	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	0.28	J	3.0	0.053	mg/Kg	1	☼	6010B SEP	Step 3
Iron	190		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	0.29	J B	0.89	0.032	mg/Kg	1	☼	6010B SEP	Step 3
Selenium	0.38	J B	0.59	0.20	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	1100		12	1.9	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.78	B	0.59	0.26	mg/Kg	1	☼	6010B SEP	Step 4
Barium	7.4		3.0	0.14	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.062	J	0.30	0.019	mg/Kg	1	☼	6010B SEP	Step 4

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Knoxville

Client Sample ID: BMW-30 (40-41) (Continued)
Lab Sample ID: 140-15492-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	0.50	J	3.0	0.063	mg/Kg	1	☼	6010B SEP	Step 4
Iron	1000		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 4
Li	1.7	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 4
Manganese	8.7		0.89	0.15	mg/Kg	1	☼	6010B SEP	Step 4
Selenium	0.76	B *	0.59	0.56	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	66	J *	180	28	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	1300		12	1.9	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.75		0.59	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Barium	4.0		3.0	0.14	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.043	J	0.30	0.014	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	0.46	J	3.0	0.055	mg/Kg	1	☼	6010B SEP	Step 6
Iron	1800		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 6
Li	0.91	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Manganese	8.0		0.89	0.30	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	37000		120	19	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.3		1.2	0.31	mg/Kg	2	☼	6010B SEP	Step 7
Barium	380		30	1.4	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.36		0.30	0.0089	mg/Kg	1	☼	6010B SEP	Step 7
Cobalt	0.76	J	5.9	0.36	mg/Kg	2	☼	6010B SEP	Step 7
Iron	2800		5.9	4.9	mg/Kg	1	☼	6010B SEP	Step 7
Li	14		3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	38		0.89	0.062	mg/Kg	1	☼	6010B SEP	Step 7
Thallium	0.87	J	4.2	0.43	mg/Kg	2	☼	6010B SEP	Step 7
Aluminum	39000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	4.1		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	0.46		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cobalt	3.1		2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	5800		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	17		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	57		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Selenium	1.8		0.50	0.17	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Thallium	0.87	J	1.8	0.18	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Chromium	7.9		1.7	0.25	mg/Kg	1	☼	6010B	Total/NA
Lead	5.9		1.7	0.32	mg/Kg	1	☼	6010B	Total/NA
Aluminum	48000		120	19	mg/Kg	10	☼	6010B	Total/NA
Arsenic	4.8		0.59	0.15	mg/Kg	1	☼	6010B	Total/NA
Barium	490		30	1.4	mg/Kg	10	☼	6010B	Total/NA
Beryllium	0.46		0.30	0.0089	mg/Kg	1	☼	6010B	Total/NA
Cobalt	3.4	J	15	0.89	mg/Kg	5	☼	6010B	Total/NA
Iron	5800		5.9	4.9	mg/Kg	1	☼	6010B	Total/NA
Lithium	18		3.0	0.18	mg/Kg	1	☼	6010B	Total/NA
Manganese	60		0.89	0.062	mg/Kg	1	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: BMW-30 (40-41) (Continued)
Lab Sample ID: 140-15492-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Molybdenum	0.17	J	2.4	0.097	mg/Kg	1	☼	6010B	Total/NA
Selenium	1.1		0.59	0.20	mg/Kg	1	☼	6010B	Total/NA
Hg	0.054	J	0.12	0.048	mg/Kg	1	☼	7470A	Total/NA

Client Sample ID: BMW-31 (14-15)
Lab Sample ID: 140-15492-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.58	J	12	0.57	mg/Kg	4	☼	6010B SEP	Step 1
Manganese	11		3.6	0.15	mg/Kg	4	☼	6010B SEP	Step 1
Barium	0.46	J *	8.9	0.43	mg/Kg	3	☼	6010B SEP	Step 2
Manganese	2.4	J	2.7	1.0	mg/Kg	3	☼	6010B SEP	Step 2
Selenium	0.77	J B	1.8	0.61	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	59		12	2.5	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.29	J	0.59	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Barium	14	B	3.0	0.14	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.069	J	0.30	0.018	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	16		3.0	0.053	mg/Kg	1	☼	6010B SEP	Step 3
Iron	120		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	260	B	0.89	0.032	mg/Kg	1	☼	6010B SEP	Step 3
Selenium	0.23	J B	0.59	0.20	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	1600		12	1.9	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	1.8	B	0.59	0.26	mg/Kg	1	☼	6010B SEP	Step 4
Barium	33		3.0	0.14	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.24	J	0.30	0.019	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	2.8	J	3.0	0.063	mg/Kg	1	☼	6010B SEP	Step 4
Iron	5600		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 4
Li	2.2	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 4
Manganese	63		0.89	0.15	mg/Kg	1	☼	6010B SEP	Step 4
Selenium	1.1	B *	0.59	0.56	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	67	J *	180	28	mg/Kg	5	☼	6010B SEP	Step 5
Barium	3.9	J *	45	2.1	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	1800		12	1.9	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.54	J	0.59	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Barium	4.4		3.0	0.14	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.059	J	0.30	0.014	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	0.46	J	3.0	0.055	mg/Kg	1	☼	6010B SEP	Step 6
Iron	1700		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 6
Li	1.3	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Manganese	10		0.89	0.30	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	26000		120	19	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	0.58	J	1.2	0.31	mg/Kg	2	☼	6010B SEP	Step 7
Barium	320		30	1.4	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.30		0.30	0.0089	mg/Kg	1	☼	6010B SEP	Step 7
Cobalt	0.82	J	5.9	0.36	mg/Kg	2	☼	6010B SEP	Step 7
Iron	3600		5.9	4.9	mg/Kg	1	☼	6010B SEP	Step 7
Li	15		3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	24		0.89	0.062	mg/Kg	1	☼	6010B SEP	Step 7
Mo	0.16	J	2.4	0.097	mg/Kg	1	☼	6010B SEP	Step 7
Thallium	0.52	J	4.2	0.43	mg/Kg	2	☼	6010B SEP	Step 7
Aluminum	30000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Golder Associates Inc.
Project/Site: Martin Lake A1 Area LF SEP + Totals

Job ID: 140-15492-1

Client Sample ID: BMW-31 (14-15) (Continued)

Lab Sample ID: 140-15492-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	3.2		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Barium	370		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.67		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cobalt	20		2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	11000		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	19		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	370		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	0.16	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Selenium	2.1		0.50	0.17	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Thallium	0.52	J	1.8	0.18	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Chromium	7.3		1.8	0.26	mg/Kg	1	☼	6010B	Total/NA
Lead	6.8		1.8	0.33	mg/Kg	1	☼	6010B	Total/NA
Aluminum	30000		120	19	mg/Kg	10	☼	6010B	Total/NA
Arsenic	3.0		0.59	0.15	mg/Kg	1	☼	6010B	Total/NA
Barium	430		30	1.4	mg/Kg	10	☼	6010B	Total/NA
Beryllium	0.66		0.30	0.0089	mg/Kg	1	☼	6010B	Total/NA
Cobalt	18		5.9	0.36	mg/Kg	2	☼	6010B	Total/NA
Iron	10000		5.9	4.9	mg/Kg	1	☼	6010B	Total/NA
Lithium	18		3.0	0.18	mg/Kg	1	☼	6010B	Total/NA
Manganese	280		0.89	0.062	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.29	J	2.4	0.097	mg/Kg	1	☼	6010B	Total/NA
Thallium	0.67	J	4.2	0.43	mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: BMW-32 (25-26)

Lab Sample ID: 140-15492-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	1.0	J	3.6	0.15	mg/Kg	4	☼	6010B SEP	Step 1
Aluminum	17	J *	36	5.7	mg/Kg	3	☼	6010B SEP	Step 2
Iron	36	*	18	10	mg/Kg	3	☼	6010B SEP	Step 2
Selenium	0.78	J B	1.8	0.61	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	81		12	2.5	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.60		0.59	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Barium	1.3	J B	3.0	0.14	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	0.060	J	3.0	0.053	mg/Kg	1	☼	6010B SEP	Step 3
Iron	500		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	0.60	J B	0.89	0.032	mg/Kg	1	☼	6010B SEP	Step 3
Selenium	0.21	J B	0.59	0.20	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	1200		12	1.9	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.78	B	0.59	0.26	mg/Kg	1	☼	6010B SEP	Step 4
Barium	17		3.0	0.14	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.025	J	0.30	0.019	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	0.60	J	3.0	0.063	mg/Kg	1	☼	6010B SEP	Step 4
Iron	2000		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 4
Li	2.5	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 4

This Detection Summary does not include radiochemical test results.

Client Sample ID: BMW-32 (25-26) (Continued)
Lab Sample ID: 140-15492-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	13		0.89	0.15	mg/Kg	1	☼	6010B SEP	Step 4
Selenium	0.62	B *	0.59	0.56	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	58	J *	180	28	mg/Kg	5	☼	6010B SEP	Step 5
Barium	3.3	J *	45	2.1	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	1100		12	1.9	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.42	J	0.59	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Barium	6.4		3.0	0.14	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.033	J	0.30	0.014	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	0.28	J	3.0	0.055	mg/Kg	1	☼	6010B SEP	Step 6
Iron	890		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 6
Li	1.0	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Manganese	10		0.89	0.30	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	32000		120	19	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.2		0.59	0.15	mg/Kg	1	☼	6010B SEP	Step 7
Barium	430		30	1.4	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.50		0.30	0.0089	mg/Kg	1	☼	6010B SEP	Step 7
Cobalt	0.76	J	5.9	0.36	mg/Kg	2	☼	6010B SEP	Step 7
Iron	2800		5.9	4.9	mg/Kg	1	☼	6010B SEP	Step 7
Li	8.2		3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	42		0.89	0.062	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	35000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	3.0		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Barium	460		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.56		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cobalt	1.7	J	2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	6200		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	12		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	67		0.75	0.052	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	7.6		1.7	0.25	mg/Kg	1	☼	6010B	Total/NA
Lead	3.9		1.7	0.31	mg/Kg	1	☼	6010B	Total/NA
Aluminum	45000		120	19	mg/Kg	10	☼	6010B	Total/NA
Arsenic	3.2		0.59	0.15	mg/Kg	1	☼	6010B	Total/NA
Barium	570		30	1.4	mg/Kg	10	☼	6010B	Total/NA
Beryllium	0.53		0.30	0.0089	mg/Kg	1	☼	6010B	Total/NA
Cobalt	1.6	J	5.9	0.36	mg/Kg	2	☼	6010B	Total/NA
Iron	5600		5.9	4.9	mg/Kg	1	☼	6010B	Total/NA
Lithium	11		3.0	0.18	mg/Kg	1	☼	6010B	Total/NA
Manganese	70		0.89	0.062	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.33	J	2.4	0.097	mg/Kg	1	☼	6010B	Total/NA
Selenium	0.54	J	0.59	0.20	mg/Kg	1	☼	6010B	Total/NA
Thallium	0.44	J	4.2	0.43	mg/Kg	2	☼	6010B	Total/NA
Hg	0.053	J	0.12	0.047	mg/Kg	1	☼	7470A	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Golder Associates Inc.
Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

Client Sample ID: BMW-33 (38-39)
Lab Sample ID: 140-15492-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	1.5	J	13	0.62	mg/Kg	4	☼	6010B SEP	Step 1
Cobalt	0.29	J	13	0.23	mg/Kg	4	☼	6010B SEP	Step 1
Manganese	17		3.9	0.16	mg/Kg	4	☼	6010B SEP	Step 1
Aluminum	10	J *	39	6.2	mg/Kg	3	☼	6010B SEP	Step 2
Barium	0.90	J *	9.7	0.46	mg/Kg	3	☼	6010B SEP	Step 2
Cobalt	0.74	J	9.7	0.24	mg/Kg	3	☼	6010B SEP	Step 2
Iron	14	J *	19	11	mg/Kg	3	☼	6010B SEP	Step 2
Manganese	25		2.9	1.1	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	94		13	2.7	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.47	J	0.65	0.17	mg/Kg	1	☼	6010B SEP	Step 3
Barium	7.5	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	1.9	J	3.2	0.058	mg/Kg	1	☼	6010B SEP	Step 3
Iron	510		6.5	3.7	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	85	B	0.97	0.035	mg/Kg	1	☼	6010B SEP	Step 3
Selenium	0.25	J B	0.65	0.22	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	1800		13	2.1	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	1.2	B	0.65	0.28	mg/Kg	1	☼	6010B SEP	Step 4
Barium	20		3.2	0.15	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.20	J	0.32	0.021	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	1.5	J	3.2	0.068	mg/Kg	1	☼	6010B SEP	Step 4
Iron	4900		6.5	3.7	mg/Kg	1	☼	6010B SEP	Step 4
Li	2.1	J	3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 4
Manganese	55		0.97	0.17	mg/Kg	1	☼	6010B SEP	Step 4
Selenium	0.71	B *	0.65	0.61	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	64	J *	190	30	mg/Kg	5	☼	6010B SEP	Step 5
Barium	4.1	J *	48	2.3	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	3400		13	2.1	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.85		0.65	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Barium	13		3.2	0.15	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.11	J	0.32	0.015	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	1.1	J	3.2	0.059	mg/Kg	1	☼	6010B SEP	Step 6
Iron	3900		6.5	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	22		0.97	0.32	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	48000		130	21	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	0.64	J	0.65	0.17	mg/Kg	1	☼	6010B SEP	Step 7
Barium	550		32	1.5	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.69		0.32	0.0097	mg/Kg	1	☼	6010B SEP	Step 7
Cobalt	0.57	J	6.5	0.39	mg/Kg	2	☼	6010B SEP	Step 7
Iron	6100		6.5	5.3	mg/Kg	1	☼	6010B SEP	Step 7
Li	9.1		3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	30		0.97	0.067	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	54000		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	590		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	1.0		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Knoxville

Client Sample ID: BMW-33 (38-39) (Continued)
Lab Sample ID: 140-15492-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	6.1		2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	15000		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	13		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	230		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Selenium	0.95		0.50	0.17	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Chromium	14		1.8	0.27	mg/Kg	1	☼	6010B	Total/NA
Lead	5.9		1.8	0.34	mg/Kg	1	☼	6010B	Total/NA
Aluminum	73000		130	21	mg/Kg	10	☼	6010B	Total/NA
Arsenic	3.2		0.65	0.17	mg/Kg	1	☼	6010B	Total/NA
Barium	830		32	1.5	mg/Kg	10	☼	6010B	Total/NA
Beryllium	1.0		0.32	0.0097	mg/Kg	1	☼	6010B	Total/NA
Cobalt	4.6	J	16	0.97	mg/Kg	5	☼	6010B	Total/NA
Iron	13000		6.5	5.3	mg/Kg	1	☼	6010B	Total/NA
Lithium	14		3.2	0.19	mg/Kg	1	☼	6010B	Total/NA
Manganese	130		0.97	0.067	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.22	J	2.6	0.11	mg/Kg	1	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: BMW-29 (30-31)
Date Collected: 05/31/19 16:45
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-1
Matrix: Solid
Percent Solids: 73.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		54	8.7	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4
Antimony	ND		16	1.5	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4
Arsenic	ND		2.7	0.71	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4
Barium	ND		14	0.65	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4
Beryllium	ND		1.4	0.42	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4
Cobalt	ND		14	0.24	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4
Iron	ND		27	16	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4
Li	ND		14	0.82	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4
Manganese	**3.8**	**J**	4.1	0.17	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4
Mo	ND		11	0.45	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4
Selenium	ND		2.7	0.93	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4
Thallium	ND		9.5	1.1	mg/Kg	☼	06/29/19 08:00	07/11/19 13:09	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**16**	**J ***	41	6.5	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3
Antimony	ND		12	1.1	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3
Arsenic	ND		2.0	0.53	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3
Barium	**1.1**	**J ***	10	0.49	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3
Beryllium	ND	*	1.0	0.065	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3
Cobalt	**1.4**	**J**	10	0.26	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3
Iron	**48**	*****	20	12	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3
Li	ND		10	0.61	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3
Manganese	**35**		3.1	1.1	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3
Mo	ND		8.2	0.33	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3
Selenium	**1.2**	**J B**	2.0	0.69	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3
Thallium	ND		7.1	0.86	mg/Kg	☼	06/30/19 08:00	07/11/19 14:53	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**170**		14	2.9	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1
Antimony	ND		4.1	0.38	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1
Arsenic	**1.4**		0.68	0.18	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1
Barium	**4.3**	**B**	3.4	0.16	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1
Beryllium	**0.11**	**J**	0.34	0.020	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1
Cobalt	**1.5**	**J**	3.4	0.061	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1
Iron	**4200**		6.8	3.9	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1
Li	ND		3.4	0.20	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1
Manganese	**95**	**B**	1.0	0.037	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1
Mo	**0.14**	**J**	2.7	0.11	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1
Selenium	**0.28**	**J B**	0.68	0.23	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1
Thallium	ND		2.4	0.29	mg/Kg	☼	07/02/19 08:00	07/11/19 16:42	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2600**		14	2.2	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1
Antimony	ND		4.1	0.61	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1
Arsenic	**0.87**	**B**	0.68	0.30	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1
Barium	**19**		3.4	0.16	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1
Beryllium	**0.23**	**J**	0.34	0.022	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1

Client Sample ID: BMW-29 (30-31)
Date Collected: 05/31/19 16:45
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-1
Matrix: Solid
Percent Solids: 73.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	3.2	J	3.4	0.072	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1
Iron	8300		6.8	3.9	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1
Li	6.7		3.4	0.20	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1
Manganese	180		1.0	0.18	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1
Mo	ND		2.7	0.11	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1
Selenium	ND	*	0.68	0.64	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1
Thallium	ND		2.4	0.39	mg/Kg	☼	07/03/19 08:00	07/11/19 18:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	500	*	200	32	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5
Antimony	ND		61	5.7	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5
Arsenic	ND		10	2.6	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5
Barium	17	J *	51	2.4	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5
Beryllium	ND	*	5.1	0.43	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5
Cobalt	1.0	J *	51	0.82	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5
Iron	530	*	100	60	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5
Li	ND		51	3.0	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5
Manganese	33	*	15	2.5	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5
Mo	ND		41	1.7	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5
Selenium	ND		10	3.5	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5
Thallium	ND	*	36	4.8	mg/Kg	☼	07/10/19 08:00	07/12/19 12:16	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	3500		14	2.2	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1
Antimony	ND		4.1	0.38	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1
Arsenic	1.1		0.68	0.20	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1
Barium	30		3.4	0.16	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1
Beryllium	0.11	J	0.34	0.016	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1
Cobalt	1.2	J	3.4	0.063	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1
Iron	4800		6.8	3.9	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1
Li	4.0		3.4	0.20	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1
Manganese	38		1.0	0.34	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1
Mo	ND		2.7	0.13	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1
Selenium	ND		0.68	0.23	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1
Thallium	ND		2.4	0.29	mg/Kg	☼	07/10/19 08:00	07/12/19 14:00	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	34000		140	22	mg/Kg	☼	07/12/19 09:08	07/15/19 13:29	10
Antimony	ND		4.1	0.19	mg/Kg	☼	07/12/19 09:08	07/15/19 12:16	1
Arsenic	0.59	J	0.68	0.18	mg/Kg	☼	07/12/19 09:08	07/15/19 12:16	1
Barium	340		34	1.6	mg/Kg	☼	07/12/19 09:08	07/15/19 13:29	10
Beryllium	0.69		0.34	0.010	mg/Kg	☼	07/12/19 09:08	07/15/19 12:16	1
Cobalt	0.90	J	6.8	0.41	mg/Kg	☼	07/12/19 09:08	07/15/19 17:32	2
Iron	6700		6.8	5.6	mg/Kg	☼	07/12/19 09:08	07/15/19 12:16	1
Li	14		3.4	0.20	mg/Kg	☼	07/12/19 09:08	07/15/19 12:16	1
Manganese	36		1.0	0.071	mg/Kg	☼	07/12/19 09:08	07/15/19 12:16	1
Mo	0.20	J	2.7	0.11	mg/Kg	☼	07/12/19 09:08	07/15/19 12:16	1

Client Sample ID: BMW-29 (30-31) **Lab Sample ID: 140-15492-1**
Date Collected: 05/31/19 16:45 **Matrix: Solid**
Date Received: 06/05/19 09:20 **Percent Solids: 73.5**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.68	0.23	mg/Kg	☼	07/12/19 09:08	07/15/19 12:16	1
Thallium	**0.74**	**J**	4.8	0.49	mg/Kg	☼	07/12/19 09:08	07/15/19 17:32	2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**41000**		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	**4.0**		0.50	0.13	mg/Kg			07/16/19 17:31	1
Barium	**410**		2.5	0.12	mg/Kg			07/16/19 17:31	1
Beryllium	**1.1**		0.25	0.0075	mg/Kg			07/16/19 17:31	1
Cobalt	**9.2**		2.5	0.023	mg/Kg			07/16/19 17:31	1
Iron	**25000**		5.0	4.1	mg/Kg			07/16/19 17:31	1
Li	**25**		2.5	0.15	mg/Kg			07/16/19 17:31	1
Manganese	**420**		0.75	0.052	mg/Kg			07/16/19 17:31	1
Mo	**0.33**	**J**	2.0	0.082	mg/Kg			07/16/19 17:31	1
Selenium	**1.5**		0.50	0.17	mg/Kg			07/16/19 17:31	1
Thallium	**0.74**	**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	**15**	**J**	25	13	mg/Kg	☼	06/26/19 08:00	07/10/19 12:23	1
Chromium	**19**		1.9	0.28	mg/Kg	☼	06/26/19 08:00	07/10/19 12:23	1
Lead	**9.7**		1.9	0.35	mg/Kg	☼	06/26/19 08:00	07/10/19 12:23	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**72000**		140	22	mg/Kg	☼	06/11/19 08:00	07/15/19 16:20	10
Antimony	ND		4.1	0.19	mg/Kg	☼	06/11/19 08:00	07/15/19 14:46	1
Arsenic	**3.8**		0.68	0.18	mg/Kg	☼	06/11/19 08:00	07/15/19 14:46	1
Barium	**630**		34	1.6	mg/Kg	☼	06/11/19 08:00	07/15/19 16:20	10
Beryllium	**1.2**		0.34	0.010	mg/Kg	☼	06/11/19 08:00	07/15/19 14:46	1
Cobalt	**10**	**J**	17	1.0	mg/Kg	☼	06/11/19 08:00	07/15/19 18:48	5
Iron	**26000**		6.8	5.6	mg/Kg	☼	06/11/19 08:00	07/15/19 14:46	1
Lithium	**31**		3.4	0.20	mg/Kg	☼	06/11/19 08:00	07/15/19 14:46	1
Manganese	**490**		1.0	0.071	mg/Kg	☼	06/11/19 08:00	07/15/19 14:46	1
Molybdenum	**0.70**	**J**	2.7	0.11	mg/Kg	☼	06/11/19 08:00	07/15/19 14:46	1
Selenium	ND		0.68	0.23	mg/Kg	☼	06/11/19 08:00	07/15/19 14:46	1
Thallium	**1.4**	**J**	12	1.2	mg/Kg	☼	06/11/19 08:00	07/15/19 18:48	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	**0.078**	**J**	0.14	0.054	mg/Kg	☼	06/11/19 08:00	06/16/19 14:19	1

Client Sample ID: BMW-30 (40-41)
Date Collected: 05/30/19 15:55
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-2
Matrix: Solid
Percent Solids: 84.1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		48	7.6	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4
Antimony	ND		14	1.3	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4
Barium	ND		12	0.57	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4
Beryllium	ND		1.2	0.37	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4
Cobalt	**0.82**	**J**	12	0.21	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4
Iron	ND		24	14	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4
Li	ND		12	0.71	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4
Manganese	**1.5**	**J**	3.6	0.15	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4
Mo	ND		9.5	0.39	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4
Selenium	ND		2.4	0.81	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4
Thallium	ND		8.3	1.0	mg/Kg	☼	06/29/19 08:00	07/11/19 13:14	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7.3**	**J ***	36	5.7	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3
Antimony	ND		11	1.0	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3
Arsenic	ND		1.8	0.46	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3
Barium	**0.52**	**J ***	8.9	0.43	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3
Beryllium	ND	*	0.89	0.057	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3
Cobalt	**0.28**	**J**	8.9	0.22	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3
Iron	**24**	****	18	10	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3
Li	ND		8.9	0.53	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3
Manganese	ND		2.7	1.0	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3
Mo	ND		7.1	0.29	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3
Selenium	**0.67**	**J B**	1.8	0.61	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3
Thallium	ND		6.2	0.75	mg/Kg	☼	06/30/19 08:00	07/11/19 14:58	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**35**		12	2.5	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1
Antimony	ND		3.6	0.33	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1
Arsenic	**1.3**		0.59	0.15	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1
Barium	**2.0**	**J B**	3.0	0.14	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1
Beryllium	ND		0.30	0.018	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1
Cobalt	**0.28**	**J**	3.0	0.053	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1
Iron	**190**		5.9	3.4	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1
Li	ND		3.0	0.18	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1
Manganese	**0.29**	**J B**	0.89	0.032	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1
Mo	ND		2.4	0.097	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1
Selenium	**0.38**	**J B**	0.59	0.20	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/02/19 08:00	07/11/19 16:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1100**		12	1.9	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1
Antimony	ND		3.6	0.53	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1
Arsenic	**0.78**	**B**	0.59	0.26	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1
Barium	**7.4**		3.0	0.14	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1
Beryllium	**0.062**	**J**	0.30	0.019	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1

Client Sample ID: BMW-30 (40-41)
Date Collected: 05/30/19 15:55
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-2
Matrix: Solid
Percent Solids: 84.1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	**0.50**	**J**	3.0	0.063	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1
Iron	**1000**		5.9	3.4	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1
Li	**1.7**	**J**	3.0	0.18	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1
Manganese	**8.7**		0.89	0.15	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1
Mo	ND		2.4	0.097	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1
Selenium	**0.76**	**B ***	0.59	0.56	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1
Thallium	ND		2.1	0.34	mg/Kg	☼	07/03/19 08:00	07/11/19 18:15	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**66**	**J ***	180	28	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5
Antimony	ND		53	5.0	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5
Arsenic	ND		8.9	2.3	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5
Barium	ND	*	45	2.1	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5
Beryllium	ND	*	4.5	0.37	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5
Cobalt	ND	*	45	0.71	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5
Iron	ND	*	89	52	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5
Li	ND		45	2.6	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5
Manganese	ND	*	13	2.2	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5
Mo	ND		36	1.5	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5
Selenium	ND		8.9	3.1	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5
Thallium	ND	*	31	4.2	mg/Kg	☼	07/10/19 08:00	07/12/19 12:21	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1300**		12	1.9	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1
Antimony	ND		3.6	0.33	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1
Arsenic	**0.75**		0.59	0.18	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1
Barium	**4.0**		3.0	0.14	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1
Beryllium	**0.043**	**J**	0.30	0.014	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1
Cobalt	**0.46**	**J**	3.0	0.055	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1
Iron	**1800**		5.9	3.4	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1
Li	**0.91**	**J**	3.0	0.18	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1
Manganese	**8.0**		0.89	0.30	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1
Mo	ND		2.4	0.12	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1
Selenium	ND		0.59	0.20	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/10/19 08:00	07/12/19 14:05	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**37000**		120	19	mg/Kg	☼	07/12/19 09:08	07/15/19 13:34	10
Antimony	ND		3.6	0.17	mg/Kg	☼	07/12/19 09:08	07/15/19 12:21	1
Arsenic	**1.3**		1.2	0.31	mg/Kg	☼	07/12/19 09:08	07/15/19 17:37	2
Barium	**380**		30	1.4	mg/Kg	☼	07/12/19 09:08	07/15/19 13:34	10
Beryllium	**0.36**		0.30	0.0089	mg/Kg	☼	07/12/19 09:08	07/15/19 12:21	1
Cobalt	**0.76**	**J**	5.9	0.36	mg/Kg	☼	07/12/19 09:08	07/15/19 17:37	2
Iron	**2800**		5.9	4.9	mg/Kg	☼	07/12/19 09:08	07/15/19 12:21	1
Li	**14**		3.0	0.18	mg/Kg	☼	07/12/19 09:08	07/15/19 12:21	1
Manganese	**38**		0.89	0.062	mg/Kg	☼	07/12/19 09:08	07/15/19 12:21	1
Mo	ND		2.4	0.097	mg/Kg	☼	07/12/19 09:08	07/15/19 12:21	1

Client Sample ID: BMW-30 (40-41)
Date Collected: 05/30/19 15:55
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-2
Matrix: Solid
Percent Solids: 84.1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		1.2	0.40	mg/Kg	☼	07/12/19 09:08	07/15/19 17:37	2
Thallium	**0.87**	**J**	4.2	0.43	mg/Kg	☼	07/12/19 09:08	07/15/19 17:37	2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**39000**		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	**4.1**		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	**0.46**		0.25	0.0075	mg/Kg			07/16/19 17:31	1
Cobalt	**3.1**		2.5	0.023	mg/Kg			07/16/19 17:31	1
Iron	**5800**		5.0	4.1	mg/Kg			07/16/19 17:31	1
Li	**17**		2.5	0.15	mg/Kg			07/16/19 17:31	1
Manganese	**57**		0.75	0.052	mg/Kg			07/16/19 17:31	1
Mo	ND		2.0	0.082	mg/Kg			07/16/19 17:31	1
Selenium	**1.8**		0.50	0.17	mg/Kg			07/16/19 17:31	1
Thallium	**0.87**	**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		23	11	mg/Kg	☼	06/26/19 08:00	07/10/19 12:28	1
Chromium	**7.9**		1.7	0.25	mg/Kg	☼	06/26/19 08:00	07/10/19 12:28	1
Lead	**5.9**		1.7	0.32	mg/Kg	☼	06/26/19 08:00	07/10/19 12:28	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**48000**		120	19	mg/Kg	☼	06/11/19 08:00	07/15/19 16:25	10
Antimony	ND		3.6	0.17	mg/Kg	☼	06/11/19 08:00	07/15/19 15:07	1
Arsenic	**4.8**		0.59	0.15	mg/Kg	☼	06/11/19 08:00	07/15/19 15:07	1
Barium	**490**		30	1.4	mg/Kg	☼	06/11/19 08:00	07/15/19 16:25	10
Beryllium	**0.46**		0.30	0.0089	mg/Kg	☼	06/11/19 08:00	07/15/19 15:07	1
Cobalt	**3.4**	**J**	15	0.89	mg/Kg	☼	06/11/19 08:00	07/15/19 18:53	5
Iron	**5800**		5.9	4.9	mg/Kg	☼	06/11/19 08:00	07/15/19 15:07	1
Lithium	**18**		3.0	0.18	mg/Kg	☼	06/11/19 08:00	07/15/19 15:07	1
Manganese	**60**		0.89	0.062	mg/Kg	☼	06/11/19 08:00	07/15/19 15:07	1
Molybdenum	**0.17**	**J**	2.4	0.097	mg/Kg	☼	06/11/19 08:00	07/15/19 15:07	1
Selenium	**1.1**		0.59	0.20	mg/Kg	☼	06/11/19 08:00	07/15/19 15:07	1
Thallium	ND		10	1.1	mg/Kg	☼	06/11/19 08:00	07/15/19 18:53	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	**0.054**	**J**	0.12	0.048	mg/Kg	☼	06/11/19 08:00	06/16/19 14:21	1

Client Sample ID: BMW-31 (14-15)
Date Collected: 05/31/19 11:15
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-3
Matrix: Solid
Percent Solids: 84.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		47	7.6	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4
Antimony	ND		14	1.3	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4
Barium	**0.58**	**J**	12	0.57	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4
Beryllium	ND		1.2	0.37	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4
Cobalt	ND		12	0.21	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4
Iron	ND		24	14	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4
Li	ND		12	0.71	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4
Manganese	**11**		3.6	0.15	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4
Mo	ND		9.5	0.39	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4
Selenium	ND		2.4	0.81	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4
Thallium	ND		8.3	1.0	mg/Kg	☼	06/29/19 08:00	07/11/19 13:35	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	*	36	5.7	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3
Antimony	ND		11	1.0	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3
Arsenic	ND		1.8	0.46	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3
Barium	**0.46**	**J ***	8.9	0.43	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3
Beryllium	ND	*	0.89	0.057	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3
Cobalt	ND		8.9	0.22	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3
Iron	ND	*	18	10	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3
Li	ND		8.9	0.53	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3
Manganese	**2.4**	**J**	2.7	1.0	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3
Mo	ND		7.1	0.29	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3
Selenium	**0.77**	**J B**	1.8	0.61	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3
Thallium	ND		6.2	0.75	mg/Kg	☼	06/30/19 08:00	07/11/19 15:03	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**59**		12	2.5	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1
Antimony	ND		3.6	0.33	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1
Arsenic	**0.29**	**J**	0.59	0.15	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1
Barium	**14**	**B**	3.0	0.14	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1
Beryllium	**0.069**	**J**	0.30	0.018	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1
Cobalt	**16**		3.0	0.053	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1
Iron	**120**		5.9	3.4	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1
Li	ND		3.0	0.18	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1
Manganese	**260**	**B**	0.89	0.032	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1
Mo	ND		2.4	0.097	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1
Selenium	**0.23**	**J B**	0.59	0.20	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/02/19 08:00	07/11/19 16:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1600**		12	1.9	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1
Antimony	ND		3.6	0.53	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1
Arsenic	**1.8**	**B**	0.59	0.26	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1
Barium	**33**		3.0	0.14	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1
Beryllium	**0.24**	**J**	0.30	0.019	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1

Client Sample ID: BMW-31 (14-15)
Date Collected: 05/31/19 11:15
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-3
Matrix: Solid
Percent Solids: 84.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	**2.8**	**J**	3.0	0.063	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1
Iron	**5600**		5.9	3.4	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1
Li	**2.2**	**J**	3.0	0.18	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1
Manganese	**63**		0.89	0.15	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1
Mo	ND		2.4	0.097	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1
Selenium	**1.1**	**B ***	0.59	0.56	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1
Thallium	ND		2.1	0.34	mg/Kg	☼	07/03/19 08:00	07/11/19 18:20	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**67**	**J ***	180	28	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5
Antimony	ND		53	5.0	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5
Arsenic	ND		8.9	2.3	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5
Barium	**3.9**	**J ***	45	2.1	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5
Beryllium	ND	*	4.5	0.37	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5
Cobalt	ND	*	45	0.71	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5
Iron	ND	*	89	52	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5
Li	ND		45	2.6	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5
Manganese	ND	*	13	2.2	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5
Mo	ND		36	1.5	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5
Selenium	ND		8.9	3.1	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5
Thallium	ND	*	31	4.2	mg/Kg	☼	07/10/19 08:00	07/12/19 12:42	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1800**		12	1.9	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1
Antimony	ND		3.6	0.33	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1
Arsenic	**0.54**	**J**	0.59	0.18	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1
Barium	**4.4**		3.0	0.14	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1
Beryllium	**0.059**	**J**	0.30	0.014	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1
Cobalt	**0.46**	**J**	3.0	0.055	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1
Iron	**1700**		5.9	3.4	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1
Li	**1.3**	**J**	3.0	0.18	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1
Manganese	**10**		0.89	0.30	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1
Mo	ND		2.4	0.12	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1
Selenium	ND		0.59	0.20	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/10/19 08:00	07/12/19 14:10	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**26000**		120	19	mg/Kg	☼	07/12/19 09:08	07/15/19 13:39	10
Antimony	ND		3.6	0.17	mg/Kg	☼	07/12/19 09:08	07/15/19 12:26	1
Arsenic	**0.58**	**J**	1.2	0.31	mg/Kg	☼	07/12/19 09:08	07/15/19 17:42	2
Barium	**320**		30	1.4	mg/Kg	☼	07/12/19 09:08	07/15/19 13:39	10
Beryllium	**0.30**		0.30	0.0089	mg/Kg	☼	07/12/19 09:08	07/15/19 12:26	1
Cobalt	**0.82**	**J**	5.9	0.36	mg/Kg	☼	07/12/19 09:08	07/15/19 17:42	2
Iron	**3600**		5.9	4.9	mg/Kg	☼	07/12/19 09:08	07/15/19 12:26	1
Li	**15**		3.0	0.18	mg/Kg	☼	07/12/19 09:08	07/15/19 12:26	1
Manganese	**24**		0.89	0.062	mg/Kg	☼	07/12/19 09:08	07/15/19 12:26	1
Mo	**0.16**	**J**	2.4	0.097	mg/Kg	☼	07/12/19 09:08	07/15/19 12:26	1

Client Sample ID: BMW-31 (14-15)
Date Collected: 05/31/19 11:15
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-3
Matrix: Solid
Percent Solids: 84.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		1.2	0.40	mg/Kg	☼	07/12/19 09:08	07/15/19 17:42	2
Thallium	**0.52**	**J**	4.2	0.43	mg/Kg	☼	07/12/19 09:08	07/15/19 17:42	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	**370**		2.5	0.12	mg/Kg			07/16/19 17:31	1
Beryllium	**0.67**		0.25	0.0075	mg/Kg			07/16/19 17:31	1
Cobalt	**20**		2.5	0.023	mg/Kg			07/16/19 17:31	1
Iron	**11000**		5.0	4.1	mg/Kg			07/16/19 17:31	1
Li	**19**		2.5	0.15	mg/Kg			07/16/19 17:31	1
Manganese	**370**		0.75	0.052	mg/Kg			07/16/19 17:31	1
Mo	**0.16**	**J**	2.0	0.082	mg/Kg			07/16/19 17:31	1
Selenium	**2.1**		0.50	0.17	mg/Kg			07/16/19 17:31	1
Thallium	**0.52**	**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 12:43	1
Chromium	**7.3**		1.8	0.26	mg/Kg	☼	06/26/19 08:00	07/10/19 12:43	1
Lead	**6.8**		1.8	0.33	mg/Kg	☼	06/26/19 08:00	07/10/19 12:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**30000**		120	19	mg/Kg	☼	06/11/19 08:00	07/15/19 16:30	10
Antimony	ND		3.6	0.17	mg/Kg	☼	06/11/19 08:00	07/15/19 15:12	1
Arsenic	**3.0**		0.59	0.15	mg/Kg	☼	06/11/19 08:00	07/15/19 15:12	1
Barium	**430**		30	1.4	mg/Kg	☼	06/11/19 08:00	07/15/19 16:30	10
Beryllium	**0.66**		0.30	0.0089	mg/Kg	☼	06/11/19 08:00	07/15/19 15:12	1
Cobalt	**18**		5.9	0.36	mg/Kg	☼	06/11/19 08:00	07/15/19 19:14	2
Iron	**10000**		5.9	4.9	mg/Kg	☼	06/11/19 08:00	07/15/19 15:12	1
Lithium	**18**		3.0	0.18	mg/Kg	☼	06/11/19 08:00	07/15/19 15:12	1
Manganese	**280**		0.89	0.062	mg/Kg	☼	06/11/19 08:00	07/15/19 15:12	1
Molybdenum	**0.29**	**J**	2.4	0.097	mg/Kg	☼	06/11/19 08:00	07/15/19 15:12	1
Selenium	ND		0.59	0.20	mg/Kg	☼	06/11/19 08:00	07/15/19 15:12	1
Thallium	**0.67**	**J**	4.2	0.43	mg/Kg	☼	06/11/19 08:00	07/15/19 19:14	2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.12	0.047	mg/Kg	☼	06/11/19 08:00	06/16/19 14:24	1

Client Sample ID: BMW-32 (25-26)
Date Collected: 05/29/19 15:45
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-4
Matrix: Solid
Percent Solids: 84.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		47	7.6	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4
Antimony	ND		14	1.3	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4
Barium	ND		12	0.57	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4
Beryllium	ND		1.2	0.37	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4
Cobalt	ND		12	0.21	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4
Iron	ND		24	14	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4
Li	ND		12	0.71	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4
Manganese	**1.0**	**J**	3.6	0.15	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4
Mo	ND		9.5	0.39	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4
Selenium	ND		2.4	0.81	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4
Thallium	ND		8.3	1.0	mg/Kg	☼	06/29/19 08:00	07/11/19 13:40	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**17**	**J ***	36	5.7	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3
Antimony	ND		11	1.0	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3
Arsenic	ND		1.8	0.46	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3
Barium	ND	*	8.9	0.43	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3
Beryllium	ND	*	0.89	0.057	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3
Cobalt	ND		8.9	0.22	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3
Iron	**36**	****	18	10	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3
Li	ND		8.9	0.53	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3
Manganese	ND		2.7	1.0	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3
Mo	ND		7.1	0.29	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3
Selenium	**0.78**	**J B**	1.8	0.61	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3
Thallium	ND		6.2	0.75	mg/Kg	☼	06/30/19 08:00	07/11/19 15:09	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**81**		12	2.5	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1
Antimony	ND		3.6	0.33	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1
Arsenic	**0.60**		0.59	0.15	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1
Barium	**1.3**	**J B**	3.0	0.14	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1
Beryllium	ND		0.30	0.018	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1
Cobalt	**0.060**	**J**	3.0	0.053	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1
Iron	**500**		5.9	3.4	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1
Li	ND		3.0	0.18	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1
Manganese	**0.60**	**J B**	0.89	0.032	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1
Mo	ND		2.4	0.097	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1
Selenium	**0.21**	**J B**	0.59	0.20	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/02/19 08:00	07/11/19 16:58	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1200**		12	1.9	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1
Antimony	ND		3.6	0.53	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1
Arsenic	**0.78**	**B**	0.59	0.26	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1
Barium	**17**		3.0	0.14	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1
Beryllium	**0.025**	**J**	0.30	0.019	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1

Client Sample ID: BMW-32 (25-26) **Lab Sample ID: 140-15492-4**
Date Collected: 05/29/19 15:45 **Matrix: Solid**
Date Received: 06/05/19 09:20 **Percent Solids: 84.2**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.60	J	3.0	0.063	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1
Iron	2000		5.9	3.4	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1
Li	2.5	J	3.0	0.18	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1
Manganese	13		0.89	0.15	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1
Mo	ND		2.4	0.097	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1
Selenium	0.62	B *	0.59	0.56	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1
Thallium	ND		2.1	0.34	mg/Kg	☼	07/03/19 08:00	07/11/19 18:25	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	58	J *	180	28	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5
Antimony	ND		53	5.0	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5
Arsenic	ND		8.9	2.3	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5
Barium	3.3	J *	45	2.1	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5
Beryllium	ND	*	4.5	0.37	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5
Cobalt	ND	*	45	0.71	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5
Iron	ND	*	89	52	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5
Li	ND		45	2.6	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5
Manganese	ND	*	13	2.2	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5
Mo	ND		36	1.5	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5
Selenium	ND		8.9	3.1	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5
Thallium	ND	*	31	4.2	mg/Kg	☼	07/10/19 08:00	07/12/19 12:47	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1100		12	1.9	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1
Antimony	ND		3.6	0.33	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1
Arsenic	0.42	J	0.59	0.18	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1
Barium	6.4		3.0	0.14	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1
Beryllium	0.033	J	0.30	0.014	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1
Cobalt	0.28	J	3.0	0.055	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1
Iron	890		5.9	3.4	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1
Li	1.0	J	3.0	0.18	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1
Manganese	10		0.89	0.30	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1
Mo	ND		2.4	0.12	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1
Selenium	ND		0.59	0.20	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/10/19 08:00	07/12/19 14:15	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	32000		120	19	mg/Kg	☼	07/12/19 09:08	07/15/19 13:44	10
Antimony	ND		3.6	0.17	mg/Kg	☼	07/12/19 09:08	07/15/19 12:32	1
Arsenic	1.2		0.59	0.15	mg/Kg	☼	07/12/19 09:08	07/15/19 12:32	1
Barium	430		30	1.4	mg/Kg	☼	07/12/19 09:08	07/15/19 13:44	10
Beryllium	0.50		0.30	0.0089	mg/Kg	☼	07/12/19 09:08	07/15/19 12:32	1
Cobalt	0.76	J	5.9	0.36	mg/Kg	☼	07/12/19 09:08	07/15/19 17:47	2
Iron	2800		5.9	4.9	mg/Kg	☼	07/12/19 09:08	07/15/19 12:32	1
Li	8.2		3.0	0.18	mg/Kg	☼	07/12/19 09:08	07/15/19 12:32	1
Manganese	42		0.89	0.062	mg/Kg	☼	07/12/19 09:08	07/15/19 12:32	1
Mo	ND		2.4	0.097	mg/Kg	☼	07/12/19 09:08	07/15/19 12:32	1

Client Sample ID: BMW-32 (25-26)
Date Collected: 05/29/19 15:45
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-4
Matrix: Solid
Percent Solids: 84.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.59	0.20	mg/Kg	☼	07/12/19 09:08	07/15/19 12:32	1
Thallium	ND		4.2	0.43	mg/Kg	☼	07/12/19 09:08	07/15/19 17:47	2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**35000**		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	**3.0**		0.50	0.13	mg/Kg			07/16/19 17:31	1
Barium	**460**		2.5	0.12	mg/Kg			07/16/19 17:31	1
Beryllium	**0.56**		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	**6200**		5.0	4.1	mg/Kg			07/16/19 17:31	1
Li	**12**		2.5	0.15	mg/Kg			07/16/19 17:31	1
Manganese	**67**		0.75	0.052	mg/Kg			07/16/19 17:31	1
Mo	ND		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		22	11	mg/Kg	☼	06/26/19 08:00	07/10/19 12:49	1
Chromium	**7.6**		1.7	0.25	mg/Kg	☼	06/26/19 08:00	07/10/19 12:49	1
Lead	**3.9**		1.7	0.31	mg/Kg	☼	06/26/19 08:00	07/10/19 12:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**45000**		120	19	mg/Kg	☼	06/11/19 08:00	07/15/19 16:35	10
Antimony	ND		3.6	0.17	mg/Kg	☼	06/11/19 08:00	07/15/19 15:18	1
Arsenic	**3.2**		0.59	0.15	mg/Kg	☼	06/11/19 08:00	07/15/19 15:18	1
Barium	**570**		30	1.4	mg/Kg	☼	06/11/19 08:00	07/15/19 16:35	10
Beryllium	**0.53**		0.30	0.0089	mg/Kg	☼	06/11/19 08:00	07/15/19 15:18	1
Cobalt	**1.6**	**J**	5.9	0.36	mg/Kg	☼	06/11/19 08:00	07/15/19 19:19	2
Iron	**5600**		5.9	4.9	mg/Kg	☼	06/11/19 08:00	07/15/19 15:18	1
Lithium	**11**		3.0	0.18	mg/Kg	☼	06/11/19 08:00	07/15/19 15:18	1
Manganese	**70**		0.89	0.062	mg/Kg	☼	06/11/19 08:00	07/15/19 15:18	1
Molybdenum	**0.33**	**J**	2.4	0.097	mg/Kg	☼	06/11/19 08:00	07/15/19 15:18	1
Selenium	**0.54**	**J**	0.59	0.20	mg/Kg	☼	06/11/19 08:00	07/15/19 15:18	1
Thallium	**0.44**	**J**	4.2	0.43	mg/Kg	☼	06/11/19 08:00	07/15/19 19:19	2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	**0.053**	**J**	0.12	0.047	mg/Kg	☼	06/11/19 08:00	06/16/19 14:27	1

Client Sample ID: BMW-33 (38-39)
Date Collected: 05/30/19 11:35
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-5
Matrix: Solid
Percent Solids: 77.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		52	8.3	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4
Antimony	ND		15	1.4	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4
Arsenic	ND		2.6	0.67	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4
Barium	**1.5**	**J**	13	0.62	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4
Beryllium	ND		1.3	0.40	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4
Cobalt	**0.29**	**J**	13	0.23	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4
Iron	ND		26	15	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4
Li	ND		13	0.77	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4
Manganese	**17**		3.9	0.16	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4
Mo	ND		10	0.42	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4
Selenium	ND		2.6	0.88	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4
Thallium	ND		9.0	1.1	mg/Kg	☼	06/29/19 08:00	07/11/19 13:45	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**10**	**J ***	39	6.2	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3
Antimony	ND		12	1.1	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3
Arsenic	ND		1.9	0.50	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3
Barium	**0.90**	**J ***	9.7	0.46	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3
Beryllium	ND	*	0.97	0.062	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3
Cobalt	**0.74**	**J**	9.7	0.24	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3
Iron	**14**	**J ***	19	11	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3
Li	ND		9.7	0.58	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3
Manganese	**25**		2.9	1.1	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3
Mo	ND		7.7	0.32	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3
Selenium	ND		1.9	0.66	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3
Thallium	ND		6.8	0.81	mg/Kg	☼	06/30/19 08:00	07/11/19 15:14	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**94**		13	2.7	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1
Antimony	ND		3.9	0.36	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1
Arsenic	**0.47**	**J**	0.65	0.17	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1
Barium	**7.5**	**B**	3.2	0.15	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1
Beryllium	**0.028**	**J**	0.32	0.019	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1
Cobalt	**1.9**	**J**	3.2	0.058	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1
Iron	**510**		6.5	3.7	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1
Li	ND		3.2	0.19	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1
Manganese	**85**	**B**	0.97	0.035	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1
Mo	ND		2.6	0.11	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1
Selenium	**0.25**	**J B**	0.65	0.22	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1
Thallium	ND		2.3	0.27	mg/Kg	☼	07/02/19 08:00	07/11/19 17:03	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1800**		13	2.1	mg/Kg	☼	07/03/19 08:00	07/11/19 18:45	1
Antimony	ND		3.9	0.58	mg/Kg	☼	07/03/19 08:00	07/11/19 18:45	1
Arsenic	**1.2**	**B**	0.65	0.28	mg/Kg	☼	07/03/19 08:00	07/11/19 18:45	1
Barium	**20**		3.2	0.15	mg/Kg	☼	07/03/19 08:00	07/11/19 18:45	1
Beryllium	**0.20**	**J**	0.32	0.021	mg/Kg	☼	07/03/19 08:00	07/11/19 18:45	1

Client Sample ID: BMW-33 (38-39)
Date Collected: 05/30/19 11:35
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-5
Matrix: Solid
Percent Solids: 77.5

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 18:45	1
Iron	**4900**		6.5	3.7	mg/Kg	☼	07/03/19 08:00	07/11/19 18:45	1
Li	**2.1**	**J**	3.2	0.19	mg/Kg	☼	07/03/19 08:00	07/11/19 18:45	1
Manganese	**55**		0.97	0.17	mg/Kg	☼	07/03/19 08:00	07/11/19 18:45	1
Mo	ND		2.6	0.11	mg/Kg	☼	07/03/19 08:00	07/11/19 18:45	1
Selenium	**0.71**	**B ***	0.65	0.61	mg/Kg	☼	07/03/19 08:00	07/11/19 18:45	1
Thallium	ND		2.3	0.37	mg/Kg	☼	07/03/19 08:00	07/11/19 18:45	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**64**	**J ***	190	30	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5
Antimony	ND		58	5.4	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5
Arsenic	ND		9.7	2.5	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5
Barium	**4.1**	**J ***	48	2.3	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5
Beryllium	ND	*	4.8	0.41	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5
Cobalt	ND	*	48	0.77	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5
Iron	ND	*	97	57	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5
Li	ND		48	2.8	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5
Manganese	ND	*	15	2.4	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5
Mo	ND		39	1.6	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5
Selenium	ND		9.7	3.4	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5
Thallium	ND	*	34	4.5	mg/Kg	☼	07/10/19 08:00	07/12/19 12:53	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3400**		13	2.1	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1
Antimony	ND		3.9	0.36	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1
Arsenic	**0.85**		0.65	0.19	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1
Barium	**13**		3.2	0.15	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1
Beryllium	**0.11**	**J**	0.32	0.015	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1
Cobalt	**1.1**	**J**	3.2	0.059	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1
Iron	**3900**		6.5	3.7	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1
Li	**2.1**	**J**	3.2	0.19	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1
Manganese	**22**		0.97	0.32	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1
Mo	ND		2.6	0.13	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1
Selenium	ND		0.65	0.22	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1
Thallium	ND		2.3	0.27	mg/Kg	☼	07/10/19 08:00	07/12/19 14:21	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**48000**		130	21	mg/Kg	☼	07/12/19 09:08	07/15/19 14:04	10
Antimony	ND		3.9	0.18	mg/Kg	☼	07/12/19 09:08	07/15/19 12:37	1
Arsenic	**0.64**	**J**	0.65	0.17	mg/Kg	☼	07/12/19 09:08	07/15/19 12:37	1
Barium	**550**		32	1.5	mg/Kg	☼	07/12/19 09:08	07/15/19 14:04	10
Beryllium	**0.69**		0.32	0.0097	mg/Kg	☼	07/12/19 09:08	07/15/19 12:37	1
Cobalt	**0.57**	**J**	6.5	0.39	mg/Kg	☼	07/12/19 09:08	07/15/19 17:52	2
Iron	**6100**		6.5	5.3	mg/Kg	☼	07/12/19 09:08	07/15/19 12:37	1
Li	**9.1**		3.2	0.19	mg/Kg	☼	07/12/19 09:08	07/15/19 12:37	1
Manganese	**30**		0.97	0.067	mg/Kg	☼	07/12/19 09:08	07/15/19 12:37	1
Mo	ND		2.6	0.11	mg/Kg	☼	07/12/19 09:08	07/15/19 12:37	1

Client Sample ID: BMW-33 (38-39)
Date Collected: 05/30/19 11:35
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-5
Matrix: Solid
Percent Solids: 77.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.65	0.22	mg/Kg	☼	07/12/19 09:08	07/15/19 12:37	1
Thallium	ND		4.5	0.46	mg/Kg	☼	07/12/19 09:08	07/15/19 17:52	2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**54000**		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	**590**		2.5	0.12	mg/Kg			07/16/19 17:31	1
Beryllium	**1.0**		0.25	0.0075	mg/Kg			07/16/19 17:31	1
Cobalt	**6.1**		2.5	0.023	mg/Kg			07/16/19 17:31	1
Iron	**15000**		5.0	4.1	mg/Kg			07/16/19 17:31	1
Li	**13**		2.5	0.15	mg/Kg			07/16/19 17:31	1
Manganese	**230**		0.75	0.052	mg/Kg			07/16/19 17:31	1
Mo	ND		2.0	0.082	mg/Kg			07/16/19 17:31	1
Selenium	**0.95**		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 12:54	1
Chromium	**14**		1.8	0.27	mg/Kg	☼	06/26/19 08:00	07/10/19 12:54	1
Lead	**5.9**		1.8	0.34	mg/Kg	☼	06/26/19 08:00	07/10/19 12:54	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**73000**		130	21	mg/Kg	☼	06/11/19 08:00	07/15/19 16:40	10
Antimony	ND		3.9	0.18	mg/Kg	☼	06/11/19 08:00	07/15/19 15:23	1
Arsenic	**3.2**		0.65	0.17	mg/Kg	☼	06/11/19 08:00	07/15/19 15:23	1
Barium	**830**		32	1.5	mg/Kg	☼	06/11/19 08:00	07/15/19 16:40	10
Beryllium	**1.0**		0.32	0.0097	mg/Kg	☼	06/11/19 08:00	07/15/19 15:23	1
Cobalt	**4.6**	**J**	16	0.97	mg/Kg	☼	06/11/19 08:00	07/15/19 19:24	5
Iron	**13000**		6.5	5.3	mg/Kg	☼	06/11/19 08:00	07/15/19 15:23	1
Lithium	**14**		3.2	0.19	mg/Kg	☼	06/11/19 08:00	07/15/19 15:23	1
Manganese	**130**		0.97	0.067	mg/Kg	☼	06/11/19 08:00	07/15/19 15:23	1
Molybdenum	**0.22**	**J**	2.6	0.11	mg/Kg	☼	06/11/19 08:00	07/15/19 15:23	1
Selenium	ND		0.65	0.22	mg/Kg	☼	06/11/19 08:00	07/15/19 15:23	1
Thallium	ND		11	1.2	mg/Kg	☼	06/11/19 08:00	07/15/19 19:24	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.13	0.052	mg/Kg	☼	06/11/19 08:00	06/16/19 14:29	1

Default Detection Limits

Client: Golder Associates Inc.
Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF 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: 140-15492-1
Project/Site: Martin Lake A1 Area LF 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

Default Detection Limits

Client: Golder Associates Inc.
Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

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: 140-15492-1
Project/Site: Martin Lake A1 Area LF 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

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

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

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

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
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

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

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

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
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

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: 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: 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

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

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

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

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

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

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: 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: 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

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

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

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

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

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		

Lab Sample ID: LCSD 140-31615/15-A
Matrix: Solid
Analysis Batch: 31713

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
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

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		

Client: Golder Associates Inc.
Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

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

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

Metals

Prep Batch: 30683

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Total/NA	Solid	Total	
140-15492-2	BMW-30 (40-41)	Total/NA	Solid	Total	
140-15492-3	BMW-31 (14-15)	Total/NA	Solid	Total	
140-15492-4	BMW-32 (25-26)	Total/NA	Solid	Total	
140-15492-5	BMW-33 (38-39)	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	

Prep Batch: 30859

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Total/NA	Solid	7470A	30683
140-15492-2	BMW-30 (40-41)	Total/NA	Solid	7470A	30683
140-15492-3	BMW-31 (14-15)	Total/NA	Solid	7470A	30683
140-15492-4	BMW-32 (25-26)	Total/NA	Solid	7470A	30683
140-15492-5	BMW-33 (38-39)	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

Analysis Batch: 30868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Total/NA	Solid	7470A	30859
140-15492-2	BMW-30 (40-41)	Total/NA	Solid	7470A	30859
140-15492-3	BMW-31 (14-15)	Total/NA	Solid	7470A	30859
140-15492-4	BMW-32 (25-26)	Total/NA	Solid	7470A	30859
140-15492-5	BMW-33 (38-39)	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

Prep Batch: 31128

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Total/NA	Solid	3050B	
140-15492-2	BMW-30 (40-41)	Total/NA	Solid	3050B	
140-15492-3	BMW-31 (14-15)	Total/NA	Solid	3050B	
140-15492-4	BMW-32 (25-26)	Total/NA	Solid	3050B	
140-15492-5	BMW-33 (38-39)	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	

SEP Batch: 31148

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 1	Solid	Exchangeable	
140-15492-2	BMW-30 (40-41)	Step 1	Solid	Exchangeable	
140-15492-3	BMW-31 (14-15)	Step 1	Solid	Exchangeable	
140-15492-4	BMW-32 (25-26)	Step 1	Solid	Exchangeable	
140-15492-5	BMW-33 (38-39)	Step 1	Solid	Exchangeable	

Metals (Continued)

SEP Batch: 31148 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
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	

Prep Batch: 31252

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 1	Solid	3010A	31148
140-15492-2	BMW-30 (40-41)	Step 1	Solid	3010A	31148
140-15492-3	BMW-31 (14-15)	Step 1	Solid	3010A	31148
140-15492-4	BMW-32 (25-26)	Step 1	Solid	3010A	31148
140-15492-5	BMW-33 (38-39)	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

SEP Batch: 31253

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 2	Solid	Carbonate	
140-15492-2	BMW-30 (40-41)	Step 2	Solid	Carbonate	
140-15492-3	BMW-31 (14-15)	Step 2	Solid	Carbonate	
140-15492-4	BMW-32 (25-26)	Step 2	Solid	Carbonate	
140-15492-5	BMW-33 (38-39)	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	

Prep Batch: 31256

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 2	Solid	3010A	31253
140-15492-2	BMW-30 (40-41)	Step 2	Solid	3010A	31253
140-15492-3	BMW-31 (14-15)	Step 2	Solid	3010A	31253
140-15492-4	BMW-32 (25-26)	Step 2	Solid	3010A	31253
140-15492-5	BMW-33 (38-39)	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

SEP Batch: 31257

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 3	Solid	Non-Crystalline	
140-15492-2	BMW-30 (40-41)	Step 3	Solid	Non-Crystalline	
140-15492-3	BMW-31 (14-15)	Step 3	Solid	Non-Crystalline	
140-15492-4	BMW-32 (25-26)	Step 3	Solid	Non-Crystalline	
140-15492-5	BMW-33 (38-39)	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	

Prep Batch: 31338

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 3	Solid	3010A	31257

Metals (Continued)

Prep Batch: 31338 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-2	BMW-30 (40-41)	Step 3	Solid	3010A	31257
140-15492-3	BMW-31 (14-15)	Step 3	Solid	3010A	31257
140-15492-4	BMW-32 (25-26)	Step 3	Solid	3010A	31257
140-15492-5	BMW-33 (38-39)	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

SEP Batch: 31341

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 4	Solid	Metal Hydroxide	
140-15492-2	BMW-30 (40-41)	Step 4	Solid	Metal Hydroxide	
140-15492-3	BMW-31 (14-15)	Step 4	Solid	Metal Hydroxide	
140-15492-4	BMW-32 (25-26)	Step 4	Solid	Metal Hydroxide	
140-15492-5	BMW-33 (38-39)	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	

Prep Batch: 31360

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 4	Solid	3010A	31341
140-15492-2	BMW-30 (40-41)	Step 4	Solid	3010A	31341
140-15492-3	BMW-31 (14-15)	Step 4	Solid	3010A	31341
140-15492-4	BMW-32 (25-26)	Step 4	Solid	3010A	31341
140-15492-5	BMW-33 (38-39)	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

SEP Batch: 31436

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 5	Solid	Organic-Bound	
140-15492-2	BMW-30 (40-41)	Step 5	Solid	Organic-Bound	
140-15492-3	BMW-31 (14-15)	Step 5	Solid	Organic-Bound	
140-15492-4	BMW-32 (25-26)	Step 5	Solid	Organic-Bound	
140-15492-5	BMW-33 (38-39)	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	

Prep Batch: 31500

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 5	Solid	3010A	31436
140-15492-2	BMW-30 (40-41)	Step 5	Solid	3010A	31436
140-15492-3	BMW-31 (14-15)	Step 5	Solid	3010A	31436
140-15492-4	BMW-32 (25-26)	Step 5	Solid	3010A	31436
140-15492-5	BMW-33 (38-39)	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

Metals

SEP Batch: 31502

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 6	Solid	Acid/Sulfide	
140-15492-2	BMW-30 (40-41)	Step 6	Solid	Acid/Sulfide	
140-15492-3	BMW-31 (14-15)	Step 6	Solid	Acid/Sulfide	
140-15492-4	BMW-32 (25-26)	Step 6	Solid	Acid/Sulfide	
140-15492-5	BMW-33 (38-39)	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	

Analysis Batch: 31553

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Total/NA	Solid	6010B	31128
140-15492-2	BMW-30 (40-41)	Total/NA	Solid	6010B	31128
140-15492-3	BMW-31 (14-15)	Total/NA	Solid	6010B	31128
140-15492-4	BMW-32 (25-26)	Total/NA	Solid	6010B	31128
140-15492-5	BMW-33 (38-39)	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

Analysis Batch: 31604

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 1	Solid	6010B SEP	31252
140-15492-1	BMW-29 (30-31)	Step 2	Solid	6010B SEP	31256
140-15492-1	BMW-29 (30-31)	Step 3	Solid	6010B SEP	31338
140-15492-1	BMW-29 (30-31)	Step 4	Solid	6010B SEP	31360
140-15492-2	BMW-30 (40-41)	Step 1	Solid	6010B SEP	31252
140-15492-2	BMW-30 (40-41)	Step 2	Solid	6010B SEP	31256
140-15492-2	BMW-30 (40-41)	Step 3	Solid	6010B SEP	31338
140-15492-2	BMW-30 (40-41)	Step 4	Solid	6010B SEP	31360
140-15492-3	BMW-31 (14-15)	Step 1	Solid	6010B SEP	31252
140-15492-3	BMW-31 (14-15)	Step 2	Solid	6010B SEP	31256
140-15492-3	BMW-31 (14-15)	Step 3	Solid	6010B SEP	31338
140-15492-3	BMW-31 (14-15)	Step 4	Solid	6010B SEP	31360
140-15492-4	BMW-32 (25-26)	Step 1	Solid	6010B SEP	31252
140-15492-4	BMW-32 (25-26)	Step 2	Solid	6010B SEP	31256
140-15492-4	BMW-32 (25-26)	Step 3	Solid	6010B SEP	31338
140-15492-4	BMW-32 (25-26)	Step 4	Solid	6010B SEP	31360
140-15492-5	BMW-33 (38-39)	Step 1	Solid	6010B SEP	31252
140-15492-5	BMW-33 (38-39)	Step 2	Solid	6010B SEP	31256
140-15492-5	BMW-33 (38-39)	Step 3	Solid	6010B SEP	31338
140-15492-5	BMW-33 (38-39)	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

Metals (Continued)

Analysis Batch: 31604 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
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

Prep Batch: 31615

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 7	Solid	Residual	
140-15492-2	BMW-30 (40-41)	Step 7	Solid	Residual	
140-15492-3	BMW-31 (14-15)	Step 7	Solid	Residual	
140-15492-4	BMW-32 (25-26)	Step 7	Solid	Residual	
140-15492-5	BMW-33 (38-39)	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	

Analysis Batch: 31651

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 5	Solid	6010B SEP	31500
140-15492-1	BMW-29 (30-31)	Step 6	Solid	6010B SEP	31502
140-15492-2	BMW-30 (40-41)	Step 5	Solid	6010B SEP	31500
140-15492-2	BMW-30 (40-41)	Step 6	Solid	6010B SEP	31502
140-15492-3	BMW-31 (14-15)	Step 5	Solid	6010B SEP	31500
140-15492-3	BMW-31 (14-15)	Step 6	Solid	6010B SEP	31502
140-15492-4	BMW-32 (25-26)	Step 5	Solid	6010B SEP	31500
140-15492-4	BMW-32 (25-26)	Step 6	Solid	6010B SEP	31502
140-15492-5	BMW-33 (38-39)	Step 5	Solid	6010B SEP	31500
140-15492-5	BMW-33 (38-39)	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

Analysis Batch: 31713

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Step 7	Solid	6010B SEP	31615
140-15492-1	BMW-29 (30-31)	Step 7	Solid	6010B SEP	31615
140-15492-1	BMW-29 (30-31)	Step 7	Solid	6010B SEP	31615
140-15492-1	BMW-29 (30-31)	Total/NA	Solid	6010B	30683
140-15492-1	BMW-29 (30-31)	Total/NA	Solid	6010B	30683
140-15492-1	BMW-29 (30-31)	Total/NA	Solid	6010B	30683
140-15492-2	BMW-30 (40-41)	Step 7	Solid	6010B SEP	31615
140-15492-2	BMW-30 (40-41)	Step 7	Solid	6010B SEP	31615
140-15492-2	BMW-30 (40-41)	Step 7	Solid	6010B SEP	31615
140-15492-2	BMW-30 (40-41)	Total/NA	Solid	6010B	30683
140-15492-2	BMW-30 (40-41)	Total/NA	Solid	6010B	30683
140-15492-2	BMW-30 (40-41)	Total/NA	Solid	6010B	30683
140-15492-3	BMW-31 (14-15)	Step 7	Solid	6010B SEP	31615
140-15492-3	BMW-31 (14-15)	Step 7	Solid	6010B SEP	31615
140-15492-3	BMW-31 (14-15)	Step 7	Solid	6010B SEP	31615
140-15492-3	BMW-31 (14-15)	Total/NA	Solid	6010B	30683

Metals (Continued)

Analysis Batch: 31713 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-3	BMW-31 (14-15)	Total/NA	Solid	6010B	30683
140-15492-3	BMW-31 (14-15)	Total/NA	Solid	6010B	30683
140-15492-4	BMW-32 (25-26)	Step 7	Solid	6010B SEP	31615
140-15492-4	BMW-32 (25-26)	Step 7	Solid	6010B SEP	31615
140-15492-4	BMW-32 (25-26)	Step 7	Solid	6010B SEP	31615
140-15492-4	BMW-32 (25-26)	Total/NA	Solid	6010B	30683
140-15492-4	BMW-32 (25-26)	Total/NA	Solid	6010B	30683
140-15492-4	BMW-32 (25-26)	Total/NA	Solid	6010B	30683
140-15492-5	BMW-33 (38-39)	Step 7	Solid	6010B SEP	31615
140-15492-5	BMW-33 (38-39)	Step 7	Solid	6010B SEP	31615
140-15492-5	BMW-33 (38-39)	Step 7	Solid	6010B SEP	31615
140-15492-5	BMW-33 (38-39)	Total/NA	Solid	6010B	30683
140-15492-5	BMW-33 (38-39)	Total/NA	Solid	6010B	30683
140-15492-5	BMW-33 (38-39)	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

Analysis Batch: 31744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Sum of Steps 1-7	Solid	6010B SEP	
140-15492-2	BMW-30 (40-41)	Sum of Steps 1-7	Solid	6010B SEP	
140-15492-3	BMW-31 (14-15)	Sum of Steps 1-7	Solid	6010B SEP	
140-15492-4	BMW-32 (25-26)	Sum of Steps 1-7	Solid	6010B SEP	
140-15492-5	BMW-33 (38-39)	Sum of Steps 1-7	Solid	6010B SEP	

General Chemistry

Analysis Batch: 30602

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15492-1	BMW-29 (30-31)	Total/NA	Solid	Moisture	
140-15492-2	BMW-30 (40-41)	Total/NA	Solid	Moisture	
140-15492-3	BMW-31 (14-15)	Total/NA	Solid	Moisture	
140-15492-4	BMW-32 (25-26)	Total/NA	Solid	Moisture	
140-15492-5	BMW-33 (38-39)	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

Client Sample ID: BMW-29 (30-31)
Lab Sample ID: 140-15492-1
Date Collected: 05/31/19 16:45
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: BMW-29 (30-31)
Lab Sample ID: 140-15492-1
Date Collected: 05/31/19 16:45
Matrix: Solid
Date Received: 06/05/19 09:20
Percent Solids: 73.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.539 g	50 mL	31128	06/26/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31553	07/10/19 12:23	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 14:46	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 16:20	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 18:48	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 13:09	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 14:53	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 16:42	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 18:09	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 12:16	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 14:00	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

Client Sample ID: BMW-29 (30-31)
Lab Sample ID: 140-15492-1
Date Collected: 05/31/19 16:45
Matrix: Solid
Date Received: 06/05/19 09:20
Percent Solids: 73.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31713	07/15/19 12:16	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 13:29	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 17:32	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 14:19	DKW	TAL KNX
	Instrument ID: HG									

Client Sample ID: BMW-30 (40-41)
Lab Sample ID: 140-15492-2
Date Collected: 05/30/19 15:55
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: BMW-30 (40-41)
Lab Sample ID: 140-15492-2
Date Collected: 05/30/19 15:55
Matrix: Solid
Date Received: 06/05/19 09:20
Percent Solids: 84.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.528 g	50 mL	31128	06/26/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31553	07/10/19 12:28	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 15:07	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 16:25	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 18:53	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 13:14	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

Client Sample ID: BMW-30 (40-41)
Lab Sample ID: 140-15492-2

Date Collected: 05/30/19 15:55
Matrix: Solid
Date Received: 06/05/19 09:20
Percent Solids: 84.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 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 14:58	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 16:47	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 18:15	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 12:21	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 14:05	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		1			31713	07/15/19 12:21	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 13:34	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 17:37	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 14:21	DKW	TAL KNX
	Instrument ID: HG									

Client Sample ID: BMW-31 (14-15)
Lab Sample ID: 140-15492-3

Date Collected: 05/31/19 11:15
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: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

Client Sample ID: BMW-31 (14-15)
Date Collected: 05/31/19 11:15
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-3
Matrix: Solid
Percent Solids: 84.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.502 g	50 mL	31128	06/26/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31553	07/10/19 12:43	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 15:12	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 16:30	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		2			31713	07/15/19 19:14	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 13:35	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 15:03	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 16:52	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 18:20	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 12:42	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 14:10	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 12:26	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 13:39	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		2			31713	07/15/19 17:42	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

Client Sample ID: BMW-31 (14-15) Lab Sample ID: 140-15492-3

Date Collected: 05/31/19 11:15 **Matrix: Solid**
Date Received: 06/05/19 09:20 **Percent Solids: 84.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	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 14:24	DKW	TAL KNX
	Instrument ID: HG									

Client Sample ID: BMW-32 (25-26) Lab Sample ID: 140-15492-4

Date Collected: 05/29/19 15:45 **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: BMW-32 (25-26) Lab Sample ID: 140-15492-4

Date Collected: 05/29/19 15:45 **Matrix: Solid**
Date Received: 06/05/19 09:20 **Percent Solids: 84.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.529 g	50 mL	31128	06/26/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31553	07/10/19 12:49	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 15:18	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		10			31713	07/15/19 16:35	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 19:19	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 13:40	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 15:09	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 16:58	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

Client Sample ID: BMW-32 (25-26)
Lab Sample ID: 140-15492-4
Date Collected: 05/29/19 15:45
Matrix: Solid
Date Received: 06/05/19 09:20
Percent Solids: 84.2

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 18:25	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 12:47	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 14:15	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 12:32	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 13:44	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		2			31713	07/15/19 17:47	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 14:27	DKW	TAL KNX
	Instrument ID: HG									

Client Sample ID: BMW-33 (38-39)
Lab Sample ID: 140-15492-5
Date Collected: 05/30/19 11:35
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: BMW-33 (38-39)
Lab Sample ID: 140-15492-5
Date Collected: 05/30/19 11:35
Matrix: Solid
Date Received: 06/05/19 09:20
Percent Solids: 77.5

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 12:54	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 15:23	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

Client Sample ID: BMW-33 (38-39)
Date Collected: 05/30/19 11:35
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15492-5
Matrix: Solid
Percent Solids: 77.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			31713	07/15/19 16:40	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 19:24	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 13:45	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 15:14	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 17:03	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 18:45	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 12:53	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 14:21	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 12:37	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 14:04	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 17:52	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 14:29	DKW	TAL KNX
	Instrument ID: HG									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

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									

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									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

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									

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									

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

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									

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									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

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									

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									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

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									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

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									

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: 140-15492-1
Project/Site: Martin Lake A1 Area LF 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: 140-15492-1
Project/Site: Martin Lake A1 Area LF SEP + Totals

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-15492-1	BMW-29 (30-31)	Solid	05/31/19 16:45	06/05/19 09:20	
140-15492-2	BMW-30 (40-41)	Solid	05/30/19 15:55	06/05/19 09:20	
140-15492-3	BMW-31 (14-15)	Solid	05/31/19 11:15	06/05/19 09:20	
140-15492-4	BMW-32 (25-26)	Solid	05/29/19 15:45	06/05/19 09:20	
140-15492-5	BMW-33 (38-39)	Solid	05/30/19 11:35	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: S. Ruiz / K. Worley	Lab PM: Walker Wasmund, Terry	Carrier Tracking No(s):	COC No: 140-6682-2228.1
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-D
Email: William_Vienne@golder.com	WO #: 19122434-D
Project Name: Martin Lake A1 Area LF SEP + Totals	Project #: 14005267
Site:	SSOW#:

Analysis Requested

140-15492 Chain of Custody

Preservation Codes:

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010B_SEP - SEP Metals (12 Metals)	6010B - Total B, Cr, Pb	Total Number of containers	Special Instructions/Note:
			Preservation Code:		N		N	I		
Bmw-29 (30-31)	5/31/19	1645	C	S	N		X	X		On Ice
Bmw-30 (40-41)	5/30/19	1555	C	S	N		X	X		" "
Bmw-31 (14-15)	5/31/19	1115	C	S	N		X	X		" "
Bmw-32 (25-26)	5/29/19	1545	C	S	N		X	X		" "
Bmw-33 (38-39)	5/30/19	1135	C	S	N		X	X		" "
RT: 1.4°C CT: 1.4°C, 1 Cooler										
FedEx SO, trk# 7876 7321 5641										
Cu Stody Seal intact										
KL 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
[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

TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST **Log In Number:** **15492**

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	✓			☐ **Containers, Broken**
2. Were ambient air containers received intact?			✓	☐ Checked in lab
3. The coolers/containers custody seal if present, is it intact?	✓			☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : SC68 Correction factor: +0.0	✓			☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel** ☐ **Cooler Out of Temp, Same Day Receipt**
5. Were all of the sample containers received intact?	✓			☐ **Containers, Broken**
6. Were samples received in appropriate containers?	✓			☐ **Containers, Improper; Client Contacted; Proceed/Cancel**
7. Do sample container labels match COC? (IDs, Dates, Times)	✓			☐ **COC & Samples Do Not Match** ☐ **COC Incorrect/Incomplete** ☐ **COC Not Received**
8. Were all of the samples listed on the COC received?	✓			☐ **Sample Received, Not on COC** ☐ **Sample on COC, Not Received**
9. Is the date/time of sample collection noted?	✓			☐ **COC; No Date/Time; Client Contacted**
10. Was the sampler identified on the COC?	✓			☐ **Sampler Not Listed on COC**
11. Is the client and project name/# identified?	✓			☐ **COC Incorrect/Incomplete**
12. Are tests/parameters listed for each sample?	✓			☐ **COC No tests on COC**
13. Is the matrix of the samples noted?	✓			☐ **COC Incorrect/Incomplete**
14. Was COC relinquished? (Signed/Dated/Timed)	✓			☐ **COC Incorrect/Incomplete**
15. Were samples received within holding time?	✓			☐ **Holding Time - Receipt**
16. Were samples received with correct chemical preservative (excluding Encore)?			✓	☐ **pH Adjusted, pH Included (See box 16A)** ☐ **Incorrect Preservative**
17. Were VOA samples received without headspace?			✓	☐ **Headspace (VOA only)**
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			✓	☐ **Residual Chlorine**
19. For 1613B water samples is pH<9?			✓	☐ If no, notify lab to adjust
20. For rad samples was sample activity info. Provided?			✓	☐ Project missing info

Comments/Actions Taken

Labeling Verified by: **Date:**

pH test strip lot number:

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: 1400526 7 PM Instructions: _____

Sample Receiving Associate: Ken Zl Date: 6/5/19

QA026R31.doc, 112618

APPENDIX C

GROUNDWATER SAMPLING RECORDS

RECORD OF WATER LEVEL READINGS

GOLDER

Project Name: LUMINANT- MLSES-A1 Location: TAYLOR TX Project No.: 191222262-D

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
BMW-24	5-15-19	0701	SOLINST	TOC	9.83				JTB	
BMW-23	5-15-19	0751		TOC	9.98					
BMW-22	5-15-19	0838		TOC	4.47					
BMW-21	5-15-19	0923		TOC	4.23					
BMW-27	5-15-19	1019		TOC	2.79					
BMW-26	5-15-19	1106		TOC	1.62					
BMW-11AR	5-15-19	1159		TOC	31.87					
BMW-19	5-15-19	1250		TOC	12.49					
BMW-18	5-15-19	1336		TOC	21.97					
BMW-28	5-15-19	1424		TOC	18.22					
BMW-20	5-15-19	1523		TOC	7.16					

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222G2-D Project Name: LUMINANT - MCSES - A1 Date: 5-15-19

Sample Number: BMW-20

Sampling Location (well ID, etc.): BMW-20

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 7.14

Casing Stickup (ft.): —

Starting Water Level (ft. BGL): 7.14

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

1526 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)
1536	—	.2	22.7	6.71	1660	0.47	-52	4.8	7.39
1541		↓	22.9	6.72	1640	0.39	-51	5.6	7.41
1546		↓	22.9	6.71	1640	0.38	-51	5.8	7.42

Water Level (ft. BMP) at End of Purge: 7.42 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1600	250mL	P	1	N	—	GEN CHEM
↓	500mL	P	1	N	HNO_3	METALS
	1L	P	2	N	HNO_3	—
	40mL	G	3	N	—	—

Comments:

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

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222G2-D Project Name: LUMINANT - MCSES - AI Date: 5-15-19

Sample Number: BMW-28	Starting Water Level (ft. BMP): 18.22
Sampling Location (well ID, etc.): BMW-28	Casing Stickup (ft.): —
Sampled by: JTB	Starting Water Level (ft. BGL): 18.22
Measuring Point (MP) of Well: TOC/PVC	Total Depth (ft. BGL): —
Screened Interval (ft. BGL): —	Casing Diameter (in ID): 2.0
Filter Pack Interval (ft. BGL): —	Casing Volume (gal.): —

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: None

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)
1427									
1437	—	.2	23.2	6.79	1720	0.41	-41	6.9	18.41
1442		↓	23.1	6.77	1740	0.26	-44	5.7	18.42
1447			23.2	6.77	1740	0.25	-43	5.9	18.41

Water Level (ft. BMP) at End of Purge: 18.41 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	Remarks (quality control sample, other)
1500	250mL	P	1	N	—	GEN CHEM
↓	500mL	P	1	N	HNO_3	METALS
	1L	P	2	N	HNO_3	—
	40mL	G	3	N	—	—

Comments:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222G2-D Project Name: LUMINANT - MCSES - AI Date: 5-15-19

Sample Number: BMW-18	Starting Water Level (ft. BMP): 21.97
Sampling Location (well ID, etc.): BMW-18	Casing Stickup (ft.): -
Sampled by: JTB	Starting Water Level (ft. BGL): 21.97
Measuring Point (MP) of Well: TOC/PVC	Total Depth (ft. BGL): -
Screened Interval (ft. BGL): -	Casing Diameter (in ID): 2.0
Filter Pack Interval (ft. BGL): -	Casing Volume (gal.): -

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

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

Water Level:	KECK	Thermometer:	HORIBA
pH Meter:	HORIBA	Field Calibration:	7-4
Conductivity Meter:	HORIBA	Field Calibration:	1413
Filter / Filter Size:	-	Other:	

SAMPLING MEASUREMENTS

Time (1338)	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)
1348	-	.2	23.4	6.68	1870	0.61	-29	6.7	22.17
1352		↓	23.5	6.64	1910	0.49	-31	7.1	22.16
1358			23.4	6.65	1920	0.49	-32	7.2	22.16

Water Level (ft. BMP) at End of Purge: 22.16 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1410	250mL	P	1	N	-	GEN CHEM
↓	500mL	P	1	N	HNO_3	METALS
	1L	P	2	N	HNO_3	-
	40mL	G	3	N	-	-

Comments:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222b2-D Project Name: LUMINANT - MCSES - A1 Date: 5-15-19

Sample Number:	BMW-19	Starting Water Level (ft. BMP):	12.49
Sampling Location (well ID, etc.):	BMW-19	Casing Stickup (ft.):	-
Sampled by:	JTB	Starting Water Level (ft. BGL):	12.49
Measuring Point (MP) of Well:	TOC/PVC	Total Depth (ft. BGL):	-
Screened Interval (ft. BGL):	-	Casing Diameter (in ID):	2.0
Filter Pack Interval (ft. BGL):	-	Casing Volume (gal.):	-

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

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

Water Level:	KECK	Thermometer:	HORIBA
pH Meter:	HORIBA	Field Calibration:	7-4
Conductivity Meter:	HORIBA	Field Calibration:	1413
Filter / Filter Size:	-	Other:	

SAMPLING MEASUREMENTS

1252 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)
1302	-	.2	22.9	6.86	1830	1.16	-13	9.6	12.71
1308			27.0	6.89	1860	1.09	-14	4.6	12.70
1315		↓	23.0	6.88	1870	1.16	-14	5.2	12.70

Water Level (ft. BMP) at End of Purge: 12.70 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1325	250mL	P	1	N	-	GEN CHEM
↓	500mL	P	1	N	HNO_3	METALS
	1L	P	2	N	HNO_3	-
↓	40mL	G	3	N	-	-

Comments:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222b2-D Project Name: LUMINANT - MCSES - A1 Date: 5-15-19

Sample Number: BMW-11AR

Sampling Location (well ID, etc.): BMW-11AR

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 31.87

Casing Stickup (ft.): —

Starting Water Level (ft. BGL): 31.87

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

1302 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)
1211	—	.2	22.7	6.83	1570	0.39	-17	4.8	32.09
1216		↓	22.9	6.84	1590	0.33	-21	3.8	32.11
1223		↓	22.9	6.84	1590	0.34	-22	4.4	32.12

Water Level (ft. BMP) at End of Purge: 32.12 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1235	250mL	P	1	N	—	GEN CHEM
↓	500mL	P	1	N	HNO_3	METALS
	1L	P	2	N	HNO_3	—
↓	40mL	G	3	N	—	—

Comments:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222b2-D Project Name: LUMINANT - MCSES - A1 Date: 5-15-19

Sample Number:	BMW-26	Starting Water Level (ft. BMP):	1.62
Sampling Location (well ID, etc.):	BMW-26	Casing Stickup (ft.):	-
Sampled by:	JTB	Starting Water Level (ft. BGL):	1.62
Measuring Point (MP) of Well:	TOC/PVC	Total Depth (ft. BGL):	-
Screened Interval (ft. BGL):	-	Casing Diameter (in ID):	2.0
Filter Pack Interval (ft. BGL):	-	Casing Volume (gal.):	-

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

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

Water Level:	KECK	Thermometer:	HORIBA
pH Meter:	HORIBA	Field Calibration:	7-4
Conductivity Meter:	HORIBA	Field Calibration:	1413
Filter / Filter Size:	-	Other:	

SAMPLING MEASUREMENTS

1609 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)
1119	-	.2	23.9	6.91	1320	0.71	-47	8.6	1.81
1123		"	24.1	6.90	1360	0.49	-44	6.7	1.82
1129		"	24.2	6.90	1370	0.51	-46	6.8	1.81

Water Level (ft. BMP) at End of Purge: 1.81 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1140	250mL	P	1	N	-	GEN CHEM
"	500mL	P	1	N	HNO_3	METALS
"	1L	P	2	N	HNO_3	-
"	40mL	G	3	N	-	-

Comments:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222b2-D Project Name: LUMINANT - MCSES - AI Date: 5-15-19

Sample Number: BMW-27
Sampling Location (well ID, etc.): BMW-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): 2.79
Casing Stickup (ft.): —
Starting Water Level (ft. BGL): 2.79
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

1022 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)
1032	—	.2	23.4	6.71	1970	0.60	-27	13	3.11
1037		↓	23.3	6.72	1940	0.46	-28	9.1	3.12
1043		↓	23.3	6.72	1950	0.44	-28	7.8	3.12

Water Level (ft. BMP) at End of Purge: 3.12
Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1055	250mL	P	1	N	—	GEN CHEM
↓	500mL	P	1	N	HNO_3	METALS
	1L	P	2	N	HNO_3	—
↓	40mL	G	3	N	—	—

Comments:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222G2-D Project Name: LUMINANT - MCSES - A1 Date: 5-15-19

Sample Number: BMW-21

Sampling Location (well ID, etc.): BMW-21

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 4.23

Casing Stickup (ft.): —

Starting Water Level (ft. BGL): 4.23

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)
0926	—	.2	22.9	6.89	1810	0.91	-6	5.7	4.91
0942		↓	22.7	6.91	1840	0.77	-11	5.1	4.43
0947		↓	22.7	6.92	1850	0.78	-12	6.8	4.43

Water Level (ft. BMP) at End of Purge: 4.43 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
0945	250mL	P	1	N	—	GEN CHEM
↓	500mL	P	1	N	HNO_3	METALS
	1L	P	2	N	HNO_3	—
	40mL	G	3	N	—	—

Comments:

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GROUNDWATER SAMPLING RECORD

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Project Number: 191222G2-D Project Name: LUMINANT - MCSES - AI Date: 5-15-19

Sample Number: BMW-22

Sampling Location (well ID, etc.): BMW-22

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 4.47

Casing Stickup (ft.): —

Starting Water Level (ft. BGL): 4.47

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)
0852	—	.2	23.1	6.64	1790	1.26	-39	13	4.61
0858		1	23.2	6.67	1810	0.92	-41	10	4.64
0902		↓	23.1	6.68	1810	0.91	-42	10	4.63

Water Level (ft. BMP) at End of Purge: 4.63

Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
0915	250mL	P	1	N	—	GEN CHEM
|	500mL	P	1	N	HNO_3	METALS
|	1L	P	2	N	HNO_3	—
↓	40mL	G	3	N	—	—

Comments:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222b2-D Project Name: LUMINANT - MCSES - A1 Date: 5-15-19

Sample Number: BMW-23

Sampling Location (well ID, etc.): BMW-23

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 9.98

Casing Stickup (ft.): —

Starting Water Level (ft. BGL): 9.98

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

0753 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)
0802	—	.2	22.7	6.82	1960	0.79	-27	11	10.27
0808		1	23.1	6.84	1940	0.52	-26	7.6	10.28
0814		↓	23.2	6.84	1940	0.53	-26	8.2	10.28

Water Level (ft. BMP) at End of Purge:

Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
0825	250mL	P	1	N	—	GEN CHEM
	500mL	P	1	N	HNO_3	METALS
	1L	P	2	N	HNO_3	—
↓	40mL	G	3	N	—	—

Comments:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222G2-D Project Name: LUMINANT - MCSES - AI Date: 5-15-19

Sample Number:	BMW-24	Starting Water Level (ft. BMP):	9.83
Sampling Location (well ID, etc.):	BMW-24	Casing Stickup (ft.):	—
Sampled by:	JTB	Starting Water Level (ft. BGL):	9.83
Measuring Point (MP) of Well:	TOC/PVC	Total Depth (ft. BGL):	—
Screened Interval (ft. BGL):	—	Casing Diameter (in ID):	2.0
Filter Pack Interval (ft. BGL):	—	Casing Volume (gal.):	—

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

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

Water Level:	KECK	Thermometer:	HORIBA
pH Meter	HORIBA	Field Calibration:	7-4
Conductivity Meter:	HORIBA	Field Calibration:	1413
Filter / Filter Size:	—	Other:	

SAMPLING MEASUREMENTS

Time	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)
0713	—	.2	21.7	6.74	2320	0.61	-17	6.6	10.16
0718		↓	22.1	6.77	2210	0.60	-16	7.8	10.17
0723			22.2	6.78	2210	0.60	-16	7.7	10.17

Water Level (ft. BMP) at End of Purge: 10.17 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
0735	250mL	P	1	N	—	GEN CHEM
↓	500mL	P	1	N	HNO_3	METALS
	1L	P	2	N	HNO_3	—
	40mL	G	3	N	—	—

Comments:

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Groundwater Sample Collection

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GOLDER

Project/Phase	19122434-D	**Equipment Decon**	☒ Dedicated equipment ☐ Decon between locations	**Depth to Water**	9.50 ft. BMP
Site Location	A-1			**Casing Stickup**	___ ft.
Date	6-13-19	**Reference Point**	☒ Top of casing	**Depth to Water**	___ ft. BGL
MW ID	BMW-25	**Location**	☐ Other ___	**Total MW Depth**	___ ft. BGL
Sample ID	BMW-25	**Water Quality**		**MW Diameter**	2 inches
Pump	☒ Waterra ☐ Submersible	**Meter Model**	1-0210A U-52	**MW Volume**	___ gallons
	☒ Peristaltic ☐ Bladder	**Unit Number**	___	**Pump Intake Depth**	___ ft. BGL

Standard volume capacity of monitoring wells: Schedule 40 PVC (1-inch OD, 0.04 gallons/foot; 2-inch OD, 0.16 gallons/foot; 4-inch OD, 0.65 gallons/foot)

Time	Purge Rate (L/min)	Cumulative Purge Volume (L)	Depth to Water (ft)	Temp (°C) ☐ NM	pH ☐ NM	Conductivity (µS/m or mS/cm) ☐ not measured	Dissolved Oxygen (mg/L) ☐ not measured	Redox Potential (mV) ☐ not measured	Turbidity (NTU) ☐ NM
0900	0.1	1.0		21.96	6.74	3.56	10.93	330	10.6
0910		2.0		21.42	6.96	3.62	9.38	316	10.9
0915		2.5		20.21	7.00	2.48	9.27	317	14.2
0920		3.0		21.36	7.01	2.21	9.19	312	16.9
0925		3.5		21.42	7.02	2.13	9.19	309	8.4
0930		4.0		21.93	7.01	2.16	9.21	306	7.0
Purging was completed based on:	☐ stabilization of water quality parameters ☐ removal of three well volumes ☐ removal of at least one half well volume (low yield well)								

Bottles Collected				Filtration	Preserved	Notes and Observations
Time	Volume	Composition (G / P)	No.	(10µm / 45µm)	(type)	(quality control sample, other)
0930				☐ filtered ☒ unfiltered		
0				☐ filtered ☒ unfiltered		

Notes: record time at which purging is started. For low flow sampling, recommended stabilization criteria: temp ± 0.5°C; pH ± 0.1 units; conductivity ± 3%; DO ± 1 mg/L; ORP ± 10 mV; for at least three successive measurements that are made every 3-5 minutes with <1 foot of stable draw down.

Unless otherwise noted, groundwater sample collection was completed in accordance with the applicable requirements of Golder's Quality Assurance Program and Standard Operating Procedure ☐ 9 Conventional Groundwater Sample Collection ☐ 10 Low Flow Groundwater Sample Collection.

Field Team Leader Alex Bartlo (name) _____ (signature)

Groundwater Sample Collection

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GOLDER

Project/Phase	19122484-D	**Equipment Decon**	☐ Dedicated equipment	**Depth to Water**	29.80 ft. BMP
Site Location	A-1		☐ Decon between locations	**Casing Stickup**	___ ft.
Date	6-13-19	**Reference Point**	~~☐ Top~~ of casing	**Depth to Water**	___ ft. BGL
MW ID	BMW-29	**Location**	☐ Other ___	**Total MW Depth**	___ ft. BGL
Sample ID	BMW-29	**Water Quality**		**MW Diameter**	2 inches
Pump	~~☐ Waterra~~ ☐ Submersible	**Meter Model**	Ladder Pump	**MW Volume**	___ gallons
	☐ Peristaltic ☐ Bladder	**Unit Number**	Horiba U-50	**Pump Intake Depth**	___ ft. BGL

Standard volume capacity of monitoring wells: Schedule 40 PVC (1-inch OD, 0.04 gallons/foot; 2-inch OD, 0.16 gallons/foot; 4-inch OD, 0.65 gallons/foot)

Time	Purge Rate (L/min)	Cumulative Purge Volume (L)	Depth to Water (ft)	Temp (°C) ☐ NM	pH ☐ NM	Conductivity (µS/m or mS/cm) ☐ not measured	Dissolved Oxygen (mg/L) ☐ not measured	Redox Potential (mV) ☐ not measured	Turbidity (NTU) ☐ NM
1000	0.1	1.0		22.94	6.36	1.98	10.36	246	131.2
1010		2.0		23.36	6.41	2.02	10.41	256	84.0
1015		2.5		24.04	7.30	2.01	10.74	274	62.8
1020		3.0		24.13	7.10	2.00	9.96	281	71.9
1025		3.5		24.24	7.11	2.00	9.34	295	62.1
1030		4.0		24.19	7.19	2.00	9.24	299	92.4
Purging was completed based on:	☐ stabilization of water quality parameters ☐ removal of three well volumes ☐ removal of at least one half well volume (low yield well)								

Bottles Collected				Filtration (10µm / 45µm)	Preserved (type)	Notes and Observations (quality control sample, other)
Time	Volume	Composition (G / P)	No.			
1030				☐ filtered ☐ unfiltered		
				☐ filtered ☐ unfiltered		

Notes: record time at which purging is started. For low flow sampling, recommended stabilization criteria: temp ± 0.5°C; pH ± 0.1 units; conductivity ± 3%; DO ± 1 mg/L; ORP ± 10 mV; for at least three successive measurements that are made every 3-5 minutes with <1 foot of stable draw down.

Unless otherwise noted, groundwater sample collection was completed in accordance with the applicable requirements of Golder's Quality Assurance Program and Standard Operating Procedure ☐ 9 Conventional Groundwater Sample Collection ☐ 10 Low Flow Groundwater Sample Collection.

Field Team Leader Alex Bartlo (name) _____ (signature)

Groundwater Sample Collection

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GOLDER

Project/Phase	19122434-D	**Equipment Decon**	☐ Dedicated equipment	**Depth to Water**	31.54 ft. BMP
Site Location	A-1		☐ Decon between locations	**Casing Stickup**	___ ft.
Date	6-13-19	**Reference Point**	☒ ~~Top~~ of casing	**Depth to Water**	___ ft. BGL
MW ID	BMW-30	**Location**	☐ Other ___	**Total MW Depth**	___ ft. BGL
Sample ID	BMW-30	**Water Quality**	Bladder Pump	**MW Diameter**	2 inches
Pump	☐ ~~Waterra~~ ☐ Submersible	**Meter Model**		**MW Volume**	___ gallons
	☐ Peristaltic ☒ ~~Bladder~~	**Unit Number**	1 ORIBA U52	**Pump Intake Depth**	___ ft. BGL

Standard volume capacity of monitoring wells: Schedule 40 PVC (1-inch OD, 0.04 gallons/foot; 2-inch OD, 0.16 gallons/foot; 4-inch OD, 0.65 gallons/foot)

Time	Purge Rate (L/min)	Cumulative Purge Volume (L)	Depth to Water (ft)	Temp (°C) ☐ NM	pH ☐ NM	Conductivity (µS/m or mS/cm) ☐ not measured	Dissolved Oxygen (mg/L) ☐ not measured	Redox Potential (mV) ☐ not measured	Turbidity (NTU) ☐ NM
1220	0.1	1.0		24.26	6.94	1.01	9.36	146	101
1230		2.0		24.52	6.92	0.92	8.41	202	97
1235		2.5		24.76	7.08	1.30	6.24	219	88
1240		3.0		24.69	7.09	1.21	7.69	258	100
1245		3.5		24.52	7.09	1.13	7.38	292	90
1250		4.0		24.61	7.09	1.15	7.94	303	82
Purging was completed based on:	☒ ~~Stabilization~~ of water quality parameters ☐ removal of three well volumes ☐ removal of at least one half well volume (low yield well)								

Bottles Collected				Filtration (10µm / 45µm)	Preserved (type)	Notes and Observations (quality control sample, other)
Time	Volume	Composition (G / P)	No.			
1250				☐ filtered ☒ ~~unfiltered~~		
				☐ filtered ☒ ~~unfiltered~~		

Notes: record time at which purging is started. For low flow sampling, recommended stabilization criteria: temp ± 0.5°C; pH ± 0.1 units; conductivity ± 3%; DO ± 1 mg/L; ORP ± 10 mV; for at least three successive measurements that are made every 3-5 minutes with <1 foot of stable draw down.

Unless otherwise noted, groundwater sample collection was completed in accordance with the applicable requirements of Golder's Quality Assurance Program and Standard Operating Procedure ☐ 9 Conventional Groundwater Sample Collection ☐ 10 Low Flow Groundwater Sample Collection.

Field Team Leader Alex Bartlo (name) Alex Bartlo (signature)

Groundwater Sample Collection

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GOLDER

Project/Phase	19122434-D	**Equipment Decon**	☑ Dedicated equipment	**Depth to Water**	9.26 ft. BMP
Site Location	A-1		☐ Decon between locations	**Casing Stickup**	___ ft.
Date	6-13-19	**Reference Point**	☑ Top of casing	**Depth to Water**	___ ft. BGL
MW ID	BMW-31	**Location**	☐ Other ___	**Total MW Depth**	___ ft. BGL
Sample ID	BMW-31	**Water Quality**		**MW Diameter**	___ inches
Pump	☑ Waterra ☐ Submersible	**Meter Model**	H20	**MW Volume**	___ gallons
	☑ Peristaltic ☐ Bladder	**Unit Number**		**Pump Intake Depth**	___ ft. BGL

Standard volume capacity of monitoring wells: Schedule 40 PVC (1-inch OD, 0.04 gallons/foot; 2-inch OD, 0.16 gallons/foot; 4-inch OD, 0.65 gallons/foot)

Time	Purge Rate (L/min)	Cumulative Purge Volume (L)	Depth to Water (ft)	Temp (°C) ☐ NM	pH ☐ NM	Conductivity (µS/m or mS/cm) ☐ not measured	Dissolved Oxygen (mg/L) ☐ not measured	Redox Potential (mV) ☐ not measured	Turbidity (NTU) ☐ NM
1400	0.1	1.0		24.90	6.90	2.16	8.36	209	126
1410		2.0		23.26	7.01	2.01	6.31	213	131
1415		2.5		24.01	7.04	2.06	9.24	224	145
1420		3.0		24.21	7.06	1.97	9.30	239	111
1425		3.5		24.12	7.01	1.92	9.21	250	130
1430		4.0		24.52	7.01	1.90	9.14	254	124
Purging was completed based on:	☒ stabilization of water quality parameters ☐ removal of three well volumes ☐ removal of at least one half well volume (low yield well)								

Bottles Collected				Filtration	Preserved	Notes and Observations
Time	Volume	Composition (G / P)	No.	(10µm / 45µm)	(type)	(quality control sample, other)
1430				☐ filtered ☒ unfiltered		
1C				☐ filtered ☒ unfiltered		

Notes: record time at which purging is started. For low flow sampling, recommended stabilization criteria: temp ± 0.5°C; pH ± 0.1 units; conductivity ± 3%; DO ± 1 mg/L; ORP ± 10 mV; for at least three successive measurements that are made every 3-5 minutes with <1 foot of stable draw down.

Unless otherwise noted, groundwater sample collection was completed in accordance with the applicable requirements of Golder's Quality Assurance Program and Standard Operating Procedure ☐ 9 Conventional Groundwater Sample Collection ☐ 10 Low Flow Groundwater Sample Collection.

Field Team Leader Alex Barzola (name) Alex Barzola (signature)

Groundwater Sample Collection

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GOLDER

Project/Phase	19122434-D	**Equipment Decon**	☒ Dedicated equipment ☐ Decon between locations	**Depth to Water**	12.53 ft. BMP
Site Location	A-1			**Casing Stickup**	3.00 ft.
Date	6-13-19	**Reference Point**	☒ Top of casing	**Depth to Water**	9.53 ft. BGL
MW ID	BMW-32	**Location**	☐ Other ___	**Total MW Depth**	40.00 ft. BGL
Sample ID	BMW-32	**Water Quality**	Horiba U 50	**MW Diameter**	2 inches
Pump	☒ Waterra ☐ Submersible	**Meter Model**		**MW Volume**	14 gallons
	☒ Peristaltic ☐ Bladder	**Unit Number**		**Pump Intake Depth**	30.00 ft. BGL

Standard volume capacity of monitoring wells: Schedule 40 PVC (1-inch OD, 0.04 gallons/foot; 2-inch OD, 0.16 gallons/foot; 4-inch OD, 0.65 gallons/foot)

Time	Purge Rate (L/min)	Cumulative Purge Volume (L)	Depth to Water (ft)	Temp (°C) ☐ NM	pH ☐ NM	Conductivity (µS/m or mS/cm) ☐ not measured	Dissolved Oxygen (mg/L) ☐ not measured	Redox Potential (mV) ☐ not measured	Turbidity (NTU) ☐ NM
0700	0.1	1.0		20.58	6.59	2.32	9.98	167	15.8
0710		2.0		21.45	6.48	2.27	9.35	142	13.5
0715		2.5		20.09	6.52	2.26	9.03	134	13.4
0720		3.0		20.12	6.54	2.26	9.03	124	13.0
0725		3.5		20.01	6.56	2.26	9.01	116	14.2
0730		4.0		20.46	6.56	2.29	9.00	114	12.1
Purging was completed based on:	☒ stabilization of water quality parameters ☐ removal of three well volumes ☐ removal of at least one half well volume (low yield well)								

Bottles Collected				Filtration	Preserved	Notes and Observations
Time	Volume	Composition (G / P)	No.	(10µm / 45µm)	(type)	(quality control sample, other)
0730				☐ filtered ☐ unfiltered		
0730				☐ filtered ☐ unfiltered		

Notes: record time at which purging is started. For low flow sampling, recommended stabilization criteria: temp ± 0.5°C; pH ± 0.1 units; conductivity ± 3%; DO ± 1 mg/L; ORP ± 10 mV; for at least three successive measurements that are made every 3-5 minutes with <1 foot of stable draw down.

Unless otherwise noted, groundwater sample collection was completed in accordance with the applicable requirements of Golder's Quality Assurance Program and Standard Operating Procedure ☐ 9 Conventional Groundwater Sample Collection ☐ 10 Low Flow Groundwater Sample Collection.

Field Team Leader Alex Barzola (name) Alex Barzola (signature)

Groundwater Sample Collection

GOLDER

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Project/Phase	19122484-D	**Equipment Decon**	☐ Dedicated equipment	**Depth to Water**	26.01 ft. BMP
Site Location	A-1		☐ Decon between locations	**Casing Stickup**	2.85 ft.
Date	6-13-19	**Reference Point**	~~☐ Top~~ of casing	**Depth to Water**	ft. BGL
MW ID	BMW-33	**Location**	☐ Other	**Total MW Depth**	48.00 ft. BGL
Sample ID	BMW-33	**Water Quality**		**MW Diameter**	2 inches
Pump	~~☐ Waterra~~ ☐ Submersible	**Meter Model**	H6216A U50	**MW Volume**	gallons
	~~☐ Peristaltic~~ ☐ Bladder	**Unit Number**		**Pump Intake Depth**	ft. BGL

Standard volume capacity of monitoring wells: Schedule 40 PVC (1-inch OD, 0.04 gallons/foot; 2-inch OD, 0.16 gallons/foot; 4-inch OD, 0.65 gallons/foot)

Time	Purge Rate (L/min)	Cumulative Purge Volume (L)	Depth to Water (ft)	Temp (°C) ☐ NM	pH ☐ NM	Conductivity (µS/m or mS/cm) ☐ not measured	Dissolved Oxygen (mg/L) ☐ not measured	Redox Potential (mV) ☐ not measured	Turbidity (NTU) ☐ NM
0745	0.1	1.0		23.79	7.07	1.48	0.42	240	7.1
0755		2.0		23.32	6.91	1.49	0.52	228	1.6
0800		2.5		23.63	6.82	1.47	0.51	227	2.7
0805		3.0		23.41	6.80	1.36	0.36	226	2.1
0810		3.5		23.64	6.80	1.40	0.21	226	1.9
0815		4.0		23.31	6.75	1.42	0.17	221	1.7

Purging was completed based on: ☐ stabilization of water quality parameters ☐ removal of three well volumes ☐ removal of at least one half well volume (low yield well)

Bottles Collected				Filtration	Preserved	Notes and Observations
Time	Volume	Composition (G / P)	No.	(10µm / 45µm)	(type)	(quality control sample, other)
0815				☐ filtered ~~☐ unfiltered~~		
0815				☐ filtered ☑ unfiltered		

Notes: record time at which purging is started. For low flow sampling, recommended stabilization criteria: temp ± 0.5°C; pH ± 0.1 units; conductivity ± 3%; DO ± 1 mg/L; ORP ± 10 mV; for at least three successive measurements that are made every 3-5 minutes with <1 foot of stable draw down.

Unless otherwise noted, groundwater sample collection was completed in accordance with the applicable requirements of Golder's Quality Assurance Program and Standard Operating Procedure ☐ 9 Conventional Groundwater Sample Collection ☐ 10 Low Flow Groundwater Sample Collection.

Field Team Leader Alex Barzdo (name) Alex Barzdo (signature)

Groundwater Sample Collection

Page ___ of ___

GOLDER

Project/Phase	19122484-D	**Equipment Decon**	☒ Dedicated equipment	**Depth to Water**	9.49 ft. BMP
Site Location	A-1		☐ Decon between locations	**Casing Stickup**	___ ft.
Date	6-13-19	**Reference Point**	☒ Top of casing	**Depth to Water**	___ ft. BGL
MW ID	MW PDP 2019-1	**Location**	☐ Other ___	**Total MW Depth**	___ ft. BGL
Sample ID	MW-PDP-2019-1	**Water Quality**		**MW Diameter**	___ inches
Pump	☒ Waterra ☐ Submersible	**Meter Model**	Horiba U-52	**MW Volume**	___ gallons
	☒ Peristaltic ☐ Bladder	**Unit Number**		**Pump Intake Depth**	___ ft. BGL

Standard volume capacity of monitoring wells: Schedule 40 PVC (1-inch OD, 0.04 gallons/foot; 2-inch OD, 0.16 gallons/foot; 4-inch OD, 0.65 gallons/foot)

Time	Purge Rate (L/min)	Cumulative Purge Volume (L)	Depth to Water (ft)	Temp (°C) ☐ NM	pH ☐ NM	Conductivity (µS/m or mS/cm) ☐ not measured	Dissolved Oxygen (mg/L) ☐ not measured	Redox Potential (mV) ☐ not measured	Turbidity (NTU) ☐ NM
1530	0.1	1.0		22.14	6.84	2.01	12.42	92	214
1540		2.0		22.04	7.36	1.36	12.36	109	105
1545		2.5		22.12	7.41	1.42	11.92	142	90
1550		3.0		22.16	7.02	1.01	10.34	139	69
1600		3.5		22.36	7.09	102	10.19	174	13
1605		4.0		22.41	7.10	1.00	10.61	202	15
Purging was completed based on:	☐ stabilization of water quality parameters ☐ removal of three well volumes ☐ removal of at least one half well volume (low yield well)								

Bottles Collected				Filtration (10µm / 45µm)	Preserved (type)	Notes and Observations (quality control sample, other)
Time	Volume	Composition (G / P)	No.			
1605				☐ filtered ☒ unfiltered		
				☐ filtered ☒ unfiltered		

Notes: record time at which purging is started. For low flow sampling, recommended stabilization criteria: temp ± 0.5°C; pH ± 0.1 units; conductivity ± 3%; DO ± 1 mg/L; ORP ± 10 mV; for at least three successive measurements that are made every 3-5 minutes with <1 foot of stable draw down.

Unless otherwise noted, groundwater sample collection was completed in accordance with the applicable requirements of Golder's Quality Assurance Program and Standard Operating Procedure ☐ 9 Conventional Groundwater Sample Collection ☐ 10 Low Flow Groundwater Sample Collection.

Field Team Leader Alex Bartlo (name) _____ (signature)

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 19122262-D Project Name: LUMINANT - HARDA LANDFILL Date: 7-9-19

Sampling Location (well ID, etc.): AIV-1B-OB-95

Sample Number: AIV-1B-OB-95

Sampled by: JTB

Measuring Point (MP) of Well: (TOC) - Steel or (PVC)

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 23.12

Casing Stickup (ft.): _____

WL (ft. BMP): _____ (ft. BGL): _____

TD (ft. BMP): _____ (ft. BGL): _____

Ft. water: _____ Casing Dia. (In ID): _____

1X Casing Vol (gal.): _____ 3X (gal): _____

QUALITY ASSURANCE

Gallons/Foot: 2": 0.16 4": 0.65 5.25": 1.12 6": 1.47 6.25": 1.59

METHODS (describe): Low Flow - Dedicated Tubing/Equipment

Cleaning Equipment: DI/Alconox Rinse

Purge: (Peristaltic Pump) / SS Pump / Bailer Sampling: (Peristaltic Pump) / SS Pump / Bailer

Disposal of Discharged Water:

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

Water Level: SOLINST Other:

Multi Meter: HORIBA

Field Calibration: AUTO CAL

Filter / Filter Size:

SAMPLING MEASUREMENTS

Begin Purge: 1109

Time	DTW (ft BTOC)	Cum. Vol. (gal. or (L))	Purge Rate (gal. or (L/m))	Temp. (oC)	DO (mg/L)	Spec. Cond. (µs/cm)	pH	ORP (mV)	Turbidity (NTU)	Color & Sediment
1118	23.31	—	.1	20.6	0.62	1920	6.71	-23	5.7	neutral
1124	23.34		.1	20.7	0.51	1930	6.68	-26	6.7	"
1129	23.35		"	20.7	0.52	1930	6.67	-26	6.2	"

WL (ft. BMP) at End of Purge: Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected					Filtration	Preservation	Remarks
Time		Volume	Composition (G, P)	No.	(Y / N)	(type)	(quality control sample, other)
1135		500mL	P	1	N		
1135		250mL	P	1	N		

Comments:

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Round Rock, Texas 78664
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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 19122262-D Project Name: LUMINANT - AI AREA LANDFILL Date: 7-9-19

Sampling Location (well ID, etc.): BMW-25 Starting Water Level (ft. BMP): 9.34

Sample Number: BMW-25 Casing Stickup (ft.): _____

Sampled by: JTB WL (ft. BMP): _____ (ft. BGL): _____

Measuring Point (MP) of Well: (TOC) - Steel or (PVC) TD (ft. BMP): _____ (ft. BGL): _____

Screened Interval (ft. BGL): — Ft. water: _____ Casing Dia. (In ID): _____

Filter Pack Interval (ft. BGL): — 1X Casing Vol (gal.): _____ 3X (gal): _____

QUALITY ASSURANCE

Gallons/Foot: 2": 0.16 4": 0.65 5.25": 1.12 6": 1.47 6.25": 1.59

METHODS (describe): Low Flow - Dedicated Tubing/Equipment

Cleaning Equipment: DI/Alconox Rinse

Purge: (Peristaltic Pump) / SS Pump / Bailer Sampling: (Peristaltic Pump) / SS Pump / Bailer

Disposal of Discharged Water:

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

Water Level: SOLINST Other:

Multi Meter: HORIBA

Field Calibration: AUTO CAL

Filter / Filter Size:

SAMPLING MEASUREMENTS

Begin Purge:

1229 Time	DTW (ft BTOC)	Cum. Vol. (gal. or (L))	Purge Rate (gal. or (L/m))	Temp. (oC)	DO (mg/L)	Spec. Cond. (µs/cm)	pH	ORP (mV)	Turbidity (NTU)	Color & Sediment
1238	9.62	—	1	21.7	1.42	2030	6.82	27	7.4	mental
1244	9.64			21.5	1.17	2020	6.83	32	6.4	
1251	9.64			21.5	1.18	2030	6.82	29	7.1	

WL (ft. BMP) at End of Purge: Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected					Filtration (Y / N)	Preservation (type)	Remarks (quality control sample, other)
Time		Volume	Composition (G, P)	No.			
1255		500mL	P	1	N		
1295		250mL	P	1	N		

Comments:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 19122262-D Project Name: LUMINANT- AI AREA LANDFILL Date: 7-9-19

Sampling Location (well ID, etc.): BMW-29 Starting Water Level (ft. BMP): 29.62

Sample Number: BMW-29 Casing Stickup (ft.): _____

Sampled by: JTB WL (ft. BMP): _____ (ft. BGL): _____

Measuring Point (MP) of Well: (TOC) - Steel or (PVC) TD (ft. BMP): _____ (ft. BGL): _____

Screened Interval (ft. BGL): - Ft. water: _____ Casing Dia. (In ID): _____

Filter Pack Interval (ft. BGL): - 1X Casing Vol (gal.): _____ 3X (gal): _____

QUALITY ASSURANCE

Gallons/Foot: 2": 0.16 4": 0.65 5.25": 1.12 6": 1.47 6.25": 1.59

METHODS (describe): Low Flow - Dedicated Tubing/Equipment

Cleaning Equipment: DI/Alconox Rinse

Purge: Peristaltic Pump / SS Pump / Bailer Bladder pump Sampling: Peristaltic Pump / SS Pump / Bailer bladder pump

Disposal of Discharged Water:

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

Water Level: SOLINST Other:

Multi Meter: HORIBA

Field Calibration: AUTOCAL

Filter / Filter Size:

SAMPLING MEASUREMENTS

Begin Purge:

0919 Time	DTW (ft BTOC)	Cum. Vol. (gal. or (L))	Purge Rate (gal. or (L /m))	Temp. (oC)	DO (mg/L)	Spec. Cond. (µs/cm)	pH	ORP (mV)	Turbidity (NTU)	Color & Sediment
0928	29.91	-	.1	22.6	2.16	1930	6.86	-17	16	mentual
0936	29.93		↓	22.7	1.76	1960	6.84	-13	7.3	
0940	29.92		↓	22.7	1.77	1960	6.83	-13	7.4	

WL (ft. BMP) at End of Purge: Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected					Filtration	Preservation	Remarks
Time		Volume	Composition (G, P)	No.	(Y / N)	(type)	(quality control sample, other)
0945		500mL	P	1	N		
0945		250mL	P	1	N		

Comments:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222 62-D Project Name: LUMINANT - A1 AREA LANDFILL Date: 7-9-19

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

Sample Number: BMW-32

Sampled by: JTB

Measuring Point (MP) of Well: (TOC) - Steel or (PVC)

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 12.39

Casing Stickup (ft.):

WL (ft. BMP): _____ (ft. BGL): _____

TD (ft. BMP): _____ (ft. BGL): _____

Ft. water: _____ Casing Dia. (In ID): _____

1X Casing Vol (gal.): _____ 3X (gal): _____

QUALITY ASSURANCE

Gallons/Foot: 2": 0.16 4": 0.65 5.25": 1.12 6": 1.47 6.25": 1.59

METHODS (describe): Low Flow - Dedicated Tubing/Equipment

Cleaning Equipment: DI/Alconox Rinse

Purge: (Peristaltic Pump) / SS Pump / Bailer Sampling: (Peristaltic Pump) / SS Pump / Bailer

Disposal of Discharged Water:

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

Water Level: SOLINST Other:

Multi Meter: HORIBA

Field Calibration: AUTO CAL

Filter / Filter Size:

SAMPLING MEASUREMENTS

Begin Purge: 1346

Time	DTW (ft BTOC)	Cum. Vol. (gal. or (L))	Purge Rate (gal. or (L/m))	Temp. (oC)	DO (mg/L)	Spec. Cond. (µs/cm)	pH	ORP (mV)	Turbidity (NTU)	Color & Sediment
1356	12.61	—	.1	21.3	1.62	2160	6.67	-7	6.7	neutral
1402	12.62		↓	21.4	1.32	2130	6.61	-11	7.2	↓
1413	12.62		↓	21.3	1.31	2130	6.62	-12	5.9	↓

WL (ft. BMP) at End of Purge: Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected					Filtration	Preservation	Remarks
Time		Volume	Composition (G, P)	No.	(Y / N)	(type)	(quality control sample, other)
1420		500mL	P	1	N		
1420		250mL	P	1	N		

Comments:

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APPENDIX B

Tier II and Tier III Monitored Natural Attenuation Evaluation

GOLDER

REPORT

MARTIN LAKE A1 LANDFILL TIER II AND III MNA EVALUATION

Submitted to:

Luminant Generation Company LLC

6555 Sierra Drive
Irving, Texas 75039

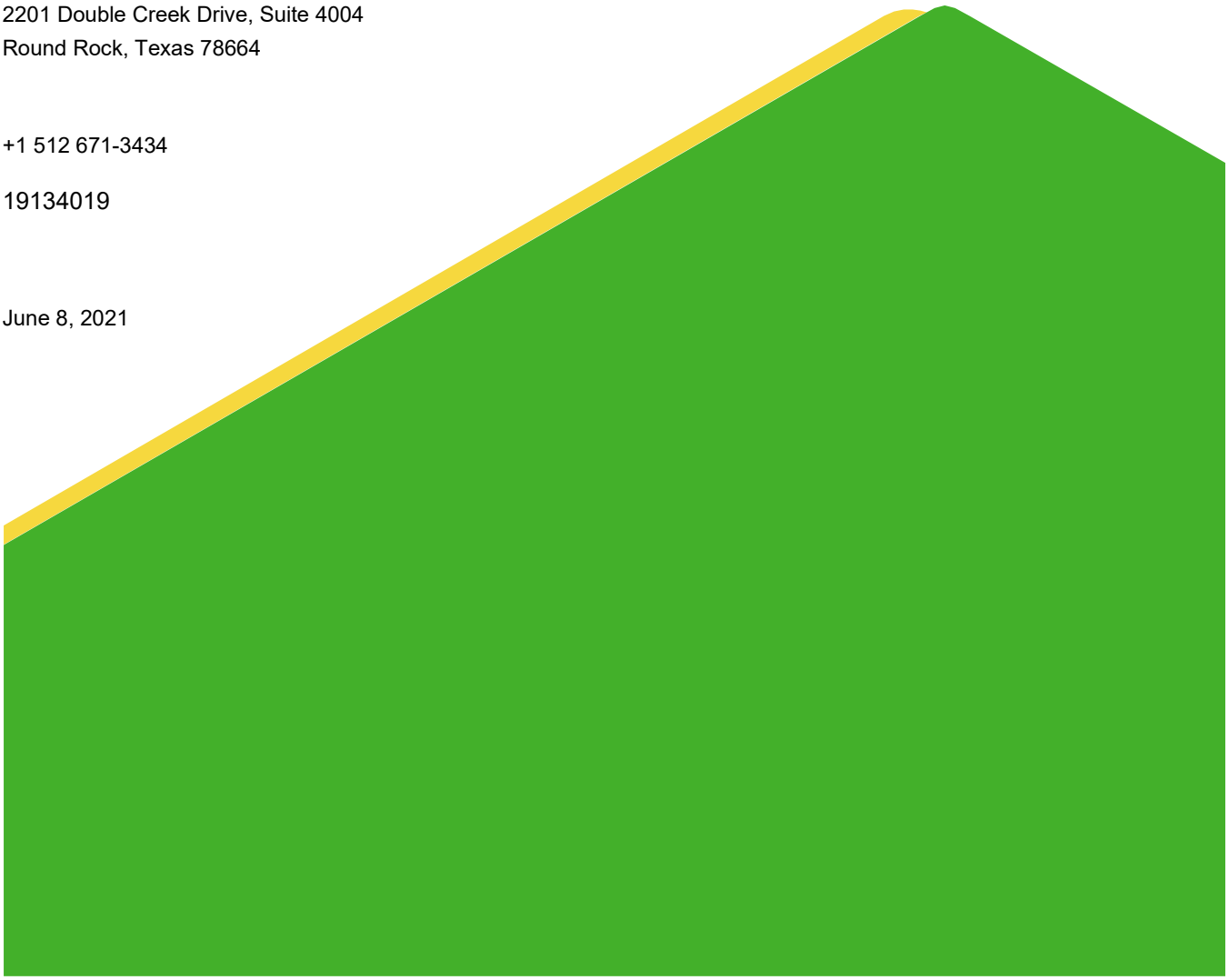
Submitted by:

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June 8, 2021



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APPENDICES

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1.0 OVERVIEW

Luminant Generation Company LLC (Luminant) operates the A1 Area Landfill located at the Beckville Lignite Mine, approximately 2.5 miles southeast of the Martin Lake Steam Electric Station (MLSES) in Panola County, Texas. Luminant manages Coal Combustion Residuals (CCR) generated from the MLSES in the A1 Area Landfill per the applicable requirements of 40 Code of Federal Regulations (CFR) Part 257 Subpart D as amended (CCR Final Rule). A map of the A1 Area Landfill 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 A1 Area Landfill (Golder 2019a). The ACM identified monitored natural attenuation (MNA) as a potential groundwater response technology for arsenic, barium, cobalt, and lithium reported at Statistically Significant Levels (SSLs) above the groundwater protection standards (GWPSs) established for the A1 Area Landfill. 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 A1 Area Landfill 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, b) 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 A1 Area Landfill 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 arsenic, barium, 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 describes the findings of the Tier II and Tier III MNA Evaluation for the A1 Area Landfill.

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

In 2019, Golder collected samples of overburden, groundwater, and landfill porewater as part of a Nature and Extent Evaluation and Tier I Evaluation in accordance with the CCR Final Rule. Groundwater data collection and analysis at the A1 Area Landfill 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 presented herein. The additional groundwater data collection consisted of three sampling events (September 2019, May 2020, and September 2020). Data from those events are included in Appendix A. The overall quality of groundwater and trends for constituents with SSLs were described in detail in the Tier I report (Golder 2019b). 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 Tier I findings as follows:

- **Plume Stability:** Based on the water quality monitoring data presented in this assessment, groundwater concentrations of arsenic, barium, cobalt, and lithium outside of the CCR unit are relatively stable or decreasing (Figure 1a, b, c, d). It should be noted that arsenic, barium, and lithium are unlikely to originate from the CCR unit due to the complete absence or low concentrations of these constituents detected in porewater. It is also considered likely that cobalt in groundwater does not originate from the CCR unit as its concentration was much lower in porewater than in some groundwater samples from the CCR monitoring well network.

- **Magnitude of Exceedances**: Occasional exceedances of the arsenic, barium, and lithium GWPS in some wells do not amount to levels that would be considered an SSL per the CCR Rule (Golder 2019a). Arsenic, barium, and lithium are currently not at an SSL in groundwater based on a 95% confidence interval at any CCR monitoring well (Golder 2019a).

  The highest level of cobalt in groundwater (since monitoring began) at the A1 Area Landfill was observed in well BMW-27 (0.255 mg/L on June 29, 2017). During the next sampling round, cobalt in groundwater from BMW-27 was below the detection limit (<0.003 mg/L). Thus, while cobalt exceedances occur periodically, the substantial range in cobalt concentrations points to variability possibly related to flow conditions and/or natural geochemical characteristics rather than a continuous source of cobalt. The only SSL at the A1 Area Landfill as of February 2021 is for cobalt at BMW-20.

- **Porewater:** Historical records are not available for ash additions or porewater concentrations over the lifespan of the CCR unit. However, based on 2019 porewater data, arsenic is not present in the CCR unit at levels above its detection limit. Barium and lithium were observed in porewater at concentrations well below their respective GWPS. This indicates that porewater from the CCR unit is not likely to be a current source for these metals. Cobalt in porewater was measured at a concentration of 0.0388 mg/L in May 2019, well below the level that is observed in groundwater when a periodic exceedance occurs in BMW-19, BMW-20, or BMW-27. This indicates that porewater is not likely to be a source for the SSL of cobalt in groundwater at BMW-20.

- **Groundwater Chemistry:** The groundwater monitoring results and the findings of the geochemical modeling support the potential for natural attenuation of arsenic, barium, 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 arsenic, barium, cobalt, and some lithium in overburden at the A1 Area Landfill. Further, differences in relative abundance of the major ions in groundwater indicate that porewater is geochemically distinct from groundwater. Detailed findings are presented in the Golder Tier I Evaluation (Golder 2019b).

- **Confirmation of Attenuation/Immobilization:** Based on both mineralogical and chemical analysis, it is evident that attenuation of arsenic, barium, 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, consistent with the inferred presence of ferrihydrite based on the geochemical modeling. 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 A1 Area Landfill demonstrate sequestration of constituents of interest 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:

- Evaluation of temporal and geographical trends in groundwater quality data to estimate site-wide attenuation rates.
- Geochemical modeling to determine the aqueous speciation of arsenic, barium, cobalt, and lithium, and evaluate saturation indices of minerals relevant to their attenuation.
- Determination of the capacity of different mechanisms to attenuate arsenic, barium, 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 A1 Area Landfill.

3.0 MODELING APPROACH

3.1 General Approach

3.1.1 Estimation of Attenuation Rates

To evaluate the attenuation of arsenic, barium, cobalt, and lithium in groundwater at the A1 Area Landfill 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 September 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 arsenic, barium, 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 and porewater quality; determine the potential for precipitation of sorbent media; evaluate the potential for mineral precipitation or adsorption in the aquifer; and determine the speciation of arsenic, barium, 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).

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 A1 Area Landfill. The results of the groundwater model were incorporated into the reactive transport geochemical model discussed in Section 3.1.4. The groundwater model was developed based on:

- Natural hydrologic boundaries wherever possible.
- Ground surface topography and landfill geometry.
- 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 Reactive Transport 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

Source control may be achieved through construction of a low permeability cap on the surface of the landfill to close the CCR material in-place. Potential final cap options for the A1 Area Landfill include either:

- Compacted Clay Cap. This cap option utilizes a low permeability compacted clay liner (infiltration layer) covered by a vegetative soil layer and permanent vegetation.
- Geomembrane Cap. This cap option utilizes a low/high density polyethylene (LLDPE/HDPE) geomembrane liner covered by a vegetative soil layer and permanent vegetation.

Both capping alternatives result in a k (conductivity) value of 10^{-7} cm/sec and a porewater flux rate from the landfill of approximately zero.

Future source control (i.e. future reduction in leakage through the A1 Area Landfill) 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 capping of the A1 Area Landfill based on the aforementioned k value of 10^{-7} cm/sec and a porewater flux rate from the landfill of zero, modeled to start at year 2021 (it should be noted the actual timing of the landfill closure has not been determined). The hydraulic head of the A1 Area Landfill was decreased to match the hydraulic head of surrounding cells outside the CCR Units, simulating the drying of the ash as the cap is installed. The PHAST model was then run in a predictive mode 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 and supersaturated (SI > -0.5) were evaluated for their potential to host arsenic, barium, 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 iron and aluminum concentrations measured in the amorphous and metal hydroxide phase of 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 in soils at the A1 Area Landfill 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 A1 Area Landfill, 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 coefficients for partitioning of lithium onto ferrihydrite or gibbsite. 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	1190	4094	12500	1135	1661	2770
	mmol X	21.31	73.31	223.83	42.07	61.56	102.66
	mol X	2.13E-02	7.33E-02	2.24E-01	4.21E-02	6.16E-02	1.03E-01
Surface Site Concentration	mol weak sites / mol X	0.2	0.2	0.2	0.41	0.41	0.41
	mol strong sites / mol X	0.005	0.005	0.005	---		
Surface Sites	mol weak	4.3E-03	1.5E-02	4.5E-02	1.7E-02	2.5E-02	4.2E-02
	mol strong	1.1E-04	3.7E-04	1.1E-03	---		
Mass of Ferrihydrite or Gibbsite	grams	1.89	6.51	19.89	3.74	5.47	9.12

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 A1 Area Landfill, the concentration of the constituents of interest (arsenic, barium, cobalt, and lithium), and the starting date for ash placement in the landfill. This calibration process simulated the gradual addition of ash to the landfill and was generally based on records of landfill construction and certification (PBW 2017). The lithium flux from the landfill was used as a near-conservative tracer to set the initial date of CCR placement, 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 0.9945 based on 150 sample point locations (Figure 2).

A hypothetical source solution was developed to represent the initial water quality at the A1 Area Landfill. Arsenic, barium, 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. Arsenic was not measured above detection limits in porewater sample during the May 2019 sampling event, but the concentration was artificially increased to 0.030 mg/L. Barium, cobalt, and lithium were measured at 0.0191, 0.0388, and 0.0161 mg/L in porewater in 2019, respectively, but for modeling purposes were increased to 1.80, 0.060, and 0.200 mg/L to achieve calibration.

To achieve calibration for the aquifer solids, the surface site densities for Hfo and Hao were adjusted for non-conservative parameters (arsenic, barium, and cobalt) within the range of the measured minimum and maximum aluminum and iron concentrations in overburden. Background water quality was based on water quality results from background monitoring well BMW-11-AR and was set to equilibrium with adsorptive surfaces. Calibration results for arsenic, cobalt, and lithium demonstrated good agreement in downgradient monitoring wells (Table 2), despite likely historical variability in source composition and ash placement in the A1 Area Landfill. For barium, good agreement was achieved for the majority of monitoring wells. Compositional heterogeneity in terms of

aquifer characteristics is likely to be present along the groundwater flow pathway but is not captured within the model. 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	Arsenic		Barium		Cobalt		Lithium	
		Target Value	Modeled	Target Value	Modeled	Target Value	Modeled	Target Value	Modeled
BMW-18	mg/L	0.002	0.002	0.032	0.039	0.003	0.003	0.019	0.020
BMW-19	mg/L	0.002	0.001	0.014	0.400	0.019	0.018	0.074	0.140
BMW-20	mg/L	0.008	0.006	0.029	0.039	0.063	0.040	0.005	0.008
BMW-21	mg/L	0.008	0.008	0.042	0.042	0.003	0.003	0.066	0.064
BMW-22	mg/L	0.002	0.003	0.060	0.060	0.003	0.003	0.084	0.086
BMW-23	mg/L	0.002	0.002	0.038	0.040	0.003	0.003	0.086	0.048
BMW-24	mg/L	0.002	0.002	1.85	1.74	0.003	0.003	0.006	0.020
BMW-26	mg/L	0.005	0.002	0.031	0.049	0.003	0.004	0.107	0.087
BMW-28	mg/L	0.002	0.002	0.015	1.80	0.003	0.006	0.095	0.200

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 (100ft)

V_x= Average Velocity (139 feet/year)

Δt = Timestep (0.5 year)

α= Longitudinal dispersivity (100 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 a 50-year simulation period. 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 cobalt would be likely. In contrast, if pH were to increase substantially (>8), cobalt precipitation as cobalt hydroxide may 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 capping of the landfill, reducing any flux from the landfill).

3.4 Data Handling and Geochemical Modeling Assumptions

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

- **Groundwater continuity:** Groundwater and porewater quality data from a sampling event conducted from May 2019 to September 2020 were evaluated. This sampling event was selected because all wells related to the A1 Area Landfill were sampled and analyzed for the full suite of parameters described in the Tier I Evaluation (Golder 2019b); the resulting data are assumed to provide a comprehensive overview of Site conditions. Temporal trend analysis of pH, arsenic, barium, cobalt, and lithium in groundwater made use of all available sampling events from a well (up to 15 samples from some wells), dating back to October 2015.
- **Background groundwater chemistry:** Groundwater samples collected from BMW-11AR were assumed to represent natural background conditions for the purpose of geochemical and predictive modeling.
- **Porewater chemistry:** The porewater sample collected from the A1 Area Landfill CCR unit was assumed to be representative of porewater found in the CCR unit.
- **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 A1 Area Landfill is constructed within and surrounded by spoil material that was excavated during lignite mining operations at the Beckville Lignite Mine. Available lithologic descriptions of the spoil material indicate that

it primarily consists of a heterogenous mixture of clay and sand with trace imbedded fragments of lignite. Native material encountered below the spoil zone is comprised of lignite or native, silty clay.

The A1 Area Landfill groundwater monitoring wells are all completed within the spoil zone. The groundwater model consisted of one layer representing the spoil overburden and the landfill. The model incorporated site-specific characteristics such as ground surface topography, groundwater elevation measurements, average depth of the spoil zone (from monitoring well boring logs), geometry of the landfill, and hydraulic characteristics based on aquifer tests conducted as part of the CCR groundwater monitoring system certification (PBW 2017). 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 the north to the west, south, and east sides of the landfill, with an average groundwater flow velocity of approximately 0.38 feet per day, or 139 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 1. Adsorption modeling in PHAST revealed adequate capacity to attenuate arsenic, barium, 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, 4, and 5 show the modeled concentrations over time for arsenic, barium, and cobalt , respectively, for the nine downgradient compliance monitoring wells accounting for adsorption to iron and aluminum oxyhydroxides and dilution/dispersion.

Modeled attenuation of arsenic onto aquifer solids (1.2 to 2.0 mg/kg using minimum surface site densities (Hfo and Hao) showed the best agreement with the range of arsenic concentrations (1.38 to 2.27 mg/kg), measured in SEP steps 3 and 4 (Golder 2019b). Barium and cobalt attenuation measured by SEP was highly variable, ranging from 9.4 to 47 mg/kg and 0.7 to 18.8 mg/kg, respectively, and therefore was not used to evaluate modeled surface attenuation. As can be seen in Figures 3 through 5, the combination of attenuation by aluminum and iron oxyhydroxides and dilution/dispersion results in concentrations of arsenic, barium, and cobalt below the GWPS at 50 years from the closure. Further, the non-detect concentrations of arsenic in porewater as well as the fact that barium concentrations in porewater are below the GWPS further support the conclusion that 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). Thus, if the concentrations of arsenic and barium in porewater at the A1 Area Landfill remain below the GWPS (or below detection limits, as was the case for arsenic), the downgradient capacity to attenuate these constituents by iron and/or aluminum oxyhydroxides will not be exceeded under the current and expected future groundwater pH and redox conditions (Figures 7 and 8).

4.2.2 Co-precipitation

In addition to adsorption, co-precipitation, or the direct incorporation of trace metals such as cobalt into precipitated iron oxide-oxyhydroxides, has been well studied (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 slightly 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, likely due to co-precipitation as well. Co-precipitation is not considered a relevant attenuation mechanism for lithium.

4.2.3 Physical Attenuation

Figure 6 presents the predicted concentrations over time for lithium at downgradient monitoring wells, accounting for the physical attenuation (i.e. dilution and dispersion) downgradient of the CCR Units. To achieve optimal calibration for lithium in the PHAST model, a simulated initial lithium source value of 0.200 mg/L was needed, resulting in calculated dilution/dispersion at downgradient wells ranging from 0 (BMW-28) to 25 (BMW-20). Thus, at current porewater concentrations, dilution/dispersion alone should be adequate to reduce lithium concentrations to below the GWPS across the A1 Area Landfill, 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 September 2020 (the CCR groundwater monitoring period) are provided in Table 3, as average site attenuation rates. This evaluation reveals that barium and lithium concentrations in **downgradient** wells have decreased (negative point decay constants) over time. In the case of arsenic, a positive decay constant was calculated in downgradient wells, albeit representing a much smaller increase than in upgradient or background wells. Cobalt also demonstrated an increasing concentration trend. However, for both arsenic and cobalt, these point decay trends do not account for any source control actions.

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, without the implementation of mitigation options. Using the maximum concentration of lithium reported at a downgradient monitoring well in 2020 (BMW-27) which did not amount to an SSL, decay calculations indicate that it will take <2.5 years to attenuate lithium to concentrations below the GWPS based on current trends. Of note, arsenic and barium concentrations in monitoring wells have already achieved compliance since their maximum measured 2020 values are lower than their respective GWPS. Based on the average point decay method, which assumes no changes to current conditions (i.e. no source control or re-lining, maximum cobalt concentrations reported from downgradient monitoring wells in 2020 suggest that cobalt concentrations will not attenuate to values below the GWPS. Despite this, it is considered unlikely that cobalt concentrations will continue to exceed the GWPS since predictive modeling in PHAST indicates that cobalt concentrations will reach the GWPS after source control at the A1 Area Landfill is complete.

Table 3: Average Point Decay Trend Constants for Arsenic, Barium, Cobalt, and Lithium at the A1 Area Landfill

Constituents	Background Wells (yr^{-1})	Downgradient Wells (yr^{-1})	GWPS (mg/L)	Maximum Measured 2020 Value (mg/L)	Time to Achieve Compliance (years)
Arsenic	0.60	0.19	0.0164	0.0126	Compliant
Barium	0.13	-0.14	2	0.24	Compliant
Cobalt	-0.82	0.12	0.0124	0.0912	Exceeded [1]
Lithium	-1.13	-0.13	0.103	0.110	<2.5

[1] This calculation only considers current trends and conditions and does not account for source control.

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, considering source control, the estimated time to attenuation to a concentration below the GWPS increased to 50 years for cobalt and lithium, while durations for arsenic and barium were similar to those from the point decay method. This is due to the elevated hypothetical source values for cobalt and lithium (0.060 and 0.200 mg/L) required to achieve model calibration. The simulated source values used were 1.55 times (cobalt) and over 12 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 7 and 8, respectively. Variations in pH and Eh are arguably the most important factors, other than physical attenuation, controlling the long-term stability of the constituents of interest.

Predictive modeling in PHAST indicates that pH and Eh in the A1 Area Landfill will remain stable. The pH, initially ranging from approximately 6.6 to 6.9 is simulated to remain constant (<0.1 change in pH from year 0 to year 50). The Eh, initially ranging from approximately -80 to 0 mV, will also remain stable, with a slight increase in the overall range over time (from approximately -80 to 10 mV). At these predicted pH and Eh ranges, ferrihydrite, the mineral phase primarily responsible for attenuation of cobalt, is modeled to remain stable across the A1 Area Landfill.

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

- **Arsenic:** For the range of pH and Eh values predicted at the site in the 50 years after closure and source control, arsenic levels are predicted to remain stable (Figure 3). It is not anticipated that attenuated arsenic will re-mobilize and exceed the GWPS in the future once compliance is achieved. For the anticipated pH range of the A1 Area Landfill, Stenge and Peterson (1989) list a partitioning coefficient of 5.86 to 19.4 L/kg for arsenic while Hfo and Hao will remain stable. Thus, with source control and stable pH and Eh, long-term stability of arsenic is expected.

- **Barium:** For the range of pH and Eh values predicted at the site in the 50 years after closure and source control, barium levels are predicted to remain stable or show a decreasing trend (Figure 4). It is not anticipated that attenuated barium will re-mobilize and exceed the GWPS in the future once compliance is achieved. For the anticipated pH range of the A1 Area Landfill, Stenge and Peterson (1989) list a partitioning coefficient of 530 to 16,000 L/kg for barium while Hfo and Hao will remain stable. Thus, with source control and stable pH and Eh, long-term stability of barium is expected.
- **Cobalt:** Attenuated cobalt should remain stable or decrease based on the range of pH and Eh values predicted at the site in the 50 years after closure and source control (Figure 5). 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 A1 Area Landfill, 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 concentrations in groundwater and porewater at the A1 Area Landfill are near or 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 A1 Area Landfill.

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 A1 Area Landfill CCR Units:

- **Adsorption Capacity Modeling:** PHAST modeling results show that adsorption is likely attenuating arsenic, barium 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 A1 Area Landfill aquifer solids. Predictive modeling (Figures 3 through 8) also demonstrates the future aquifer’s capacity to adsorb constituents from the CCR Units is significant and adequate when source control has been implemented. 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 presence of arsenic, barium, cobalt, and to a small 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. 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 A1 Area Landfill Attenuation Rates:** The groundwater concentration of lithium is decreasing in downgradient monitoring wells over time, resulting in negative calculated point decay rates. Using the mean

decay rate, maximum concentrations of lithium observed in downgradient monitoring wells in 2020 would take approximately <2.5 years to attenuate below the GWPS. Arsenic and barium concentrations in downgradient monitoring wells are already below the GWPS based upon the most recent September 2020 sampling event. Cobalt is expected to attenuate below the GWPS after capping of the A1 Area Landfill.

- **Dilution/Dispersion (Physical Attenuation) Modeling:** Lithium levels at downgradient monitoring wells can be used to estimate the degree of dilution/dispersion occurring downgradient of the CCR Units. Using a source value for lithium of 0.200 mg/L in the PHAST model, a minimum and maximum downgradient physical attenuation factor of 0 to 12 was determined. Thus, at current porewater concentrations (which are lower than the GWPS), even with no dilution/dispersion, lithium levels would remain below the GWPS across the A1 Area Landfill.

Based on these findings, arsenic, barium, 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 A1 Area Landfill:

- **Adsorption Capacity Modeling:** Predictive modeling has demonstrated that porewater concentrations of arsenic, barium, cobalt, and lithium could increase to 0.030, 1.80, 0.060, and 0.200 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, arsenic concentrations in porewater samples from the CCR Units were never above detection (<0.002 mg/L) while barium and lithium levels in porewater were below the GWPS (0.019 mg/L and 0.0161 mg/L, respectively). 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 arsenic, barium, cobalt, and lithium mass in the CCR Units to concentrations below the GWPS. In addition to aluminum and iron oxyhydroxides, arsenic, barium, 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 A1 Area Landfill.

- **Stability of Constituents:** Reactive transport 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 constant within the expected range of groundwater conditions. The total aluminum and iron contents in aquifer solids, based on the Tier I Evaluation (Golder 2019b), range from 30,000 to 73,000 mg/kg and 6,000 to 26,000 mg/kg, respectively (by SEP Total), 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 arsenic, barium, cobalt, and lithium at the A1 Area Landfill CCR Unit. 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:

- Arsenic: Physical and chemical attenuation of arsenic is occurring. Arsenic levels in groundwater are stable, and the aquifer has adequate capacity to attenuate arsenic in a reasonable timeframe. Modeling indicates that arsenic attenuation will be efficient and stable in the long term. Arsenic in CCR unit porewater has never been measured above detection limits. Therefore, arsenic is considered a candidate for MNA at the A1 Area Landfill.
- Barium: Physical and chemical attenuation of barium is occurring. Barium levels in groundwater are stable, and the aquifer has adequate capacity to attenuate barium in a reasonable timeframe. Modeling indicates that barium attenuation will be efficient and stable in the long term. Barium in porewater of the CCR Units is currently below the GWPS. Therefore, barium is considered a candidate for MNA at the A1 Area Landfill.
- 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 porewater is well below the level that is observed in groundwater when a periodic exceedance occurs. Therefore, cobalt is considered a candidate for MNA at the A1 Area Landfill.
- Lithium: Physical attenuation of lithium is occurring. Lithium levels in groundwater are stable, and the aquifer has adequate capacity to attenuate arsenic in a reasonable timeframe. Modeling indicates that lithium attenuation will be efficient and stable in the long term. Lithium in CCR unit porewater has never been measured above the GWPS. Therefore, lithium is considered a candidate for MNA at the A1 Area Landfill.

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 arsenic, barium, cobalt, and lithium at the A1 Area Landfill.

Signature Page

Golder Associates Inc.



PJ Nolan, PhD
Senior Project Geochemist



Patrick J. Behling, PE
Principal Engineer



William F. Vienne
Senior Hydrogeologist

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https://golderassociates.sharepoint.com/sites/127388/project files/5 technical work/3000-a1 area landfill/tier ii report/final martin lake a1 tier ii&iii eval v.2.docx

8.0 REFERENCES

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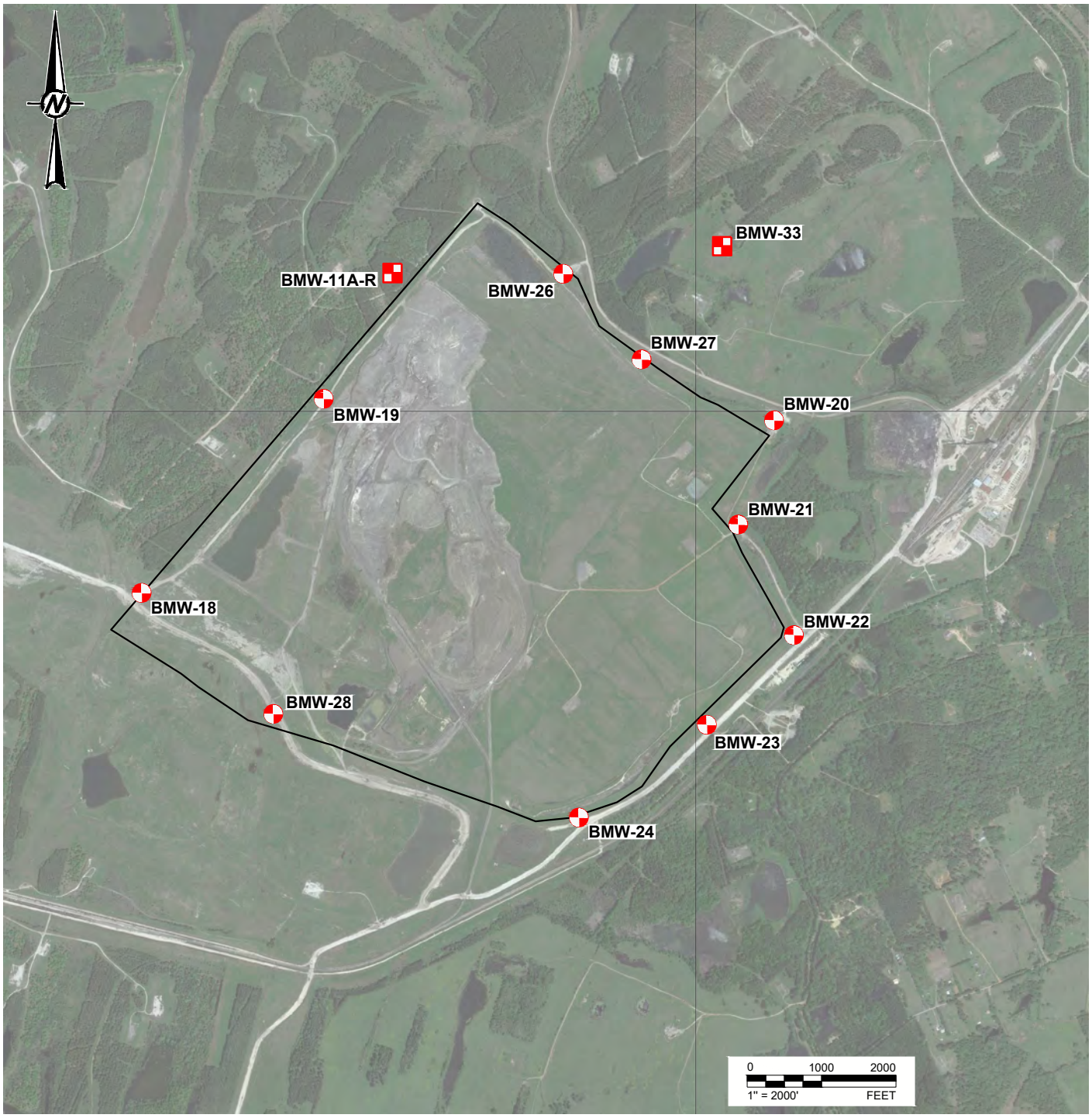
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Figures



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 A1 LANDFILL AREA

PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

TITLE
DETAILED SITE PLAN - A1 AREA LANDFILL

CONSULTANT
GOLDER

YYYY-MM-DD	2021-01-11
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

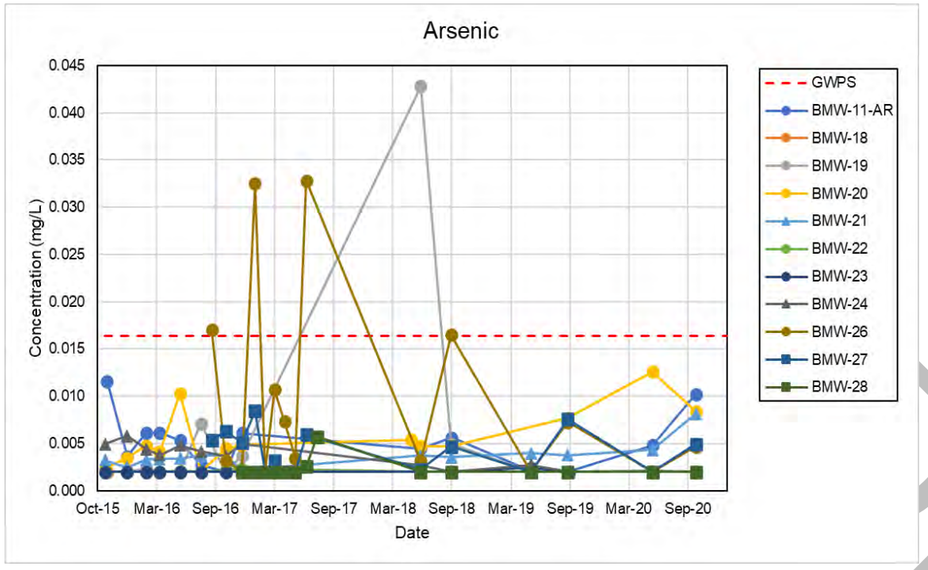
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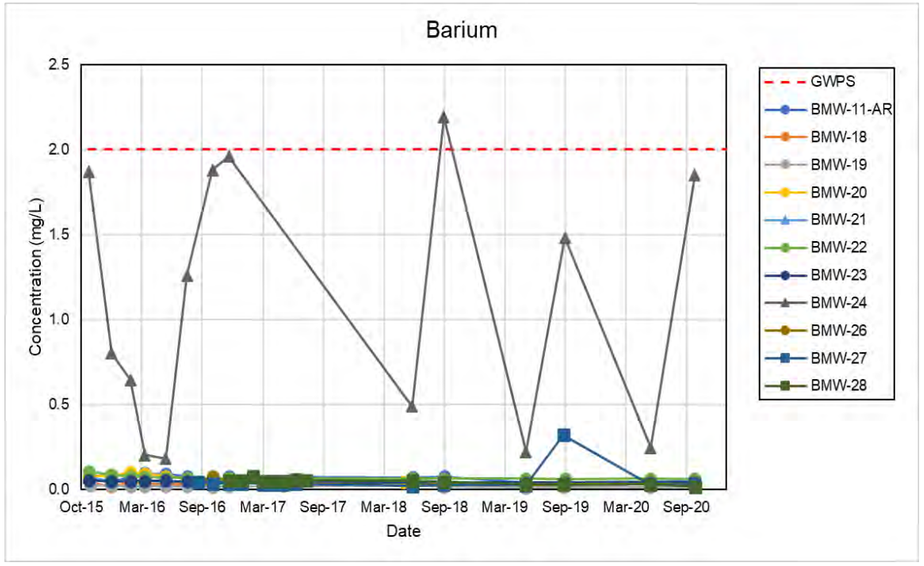
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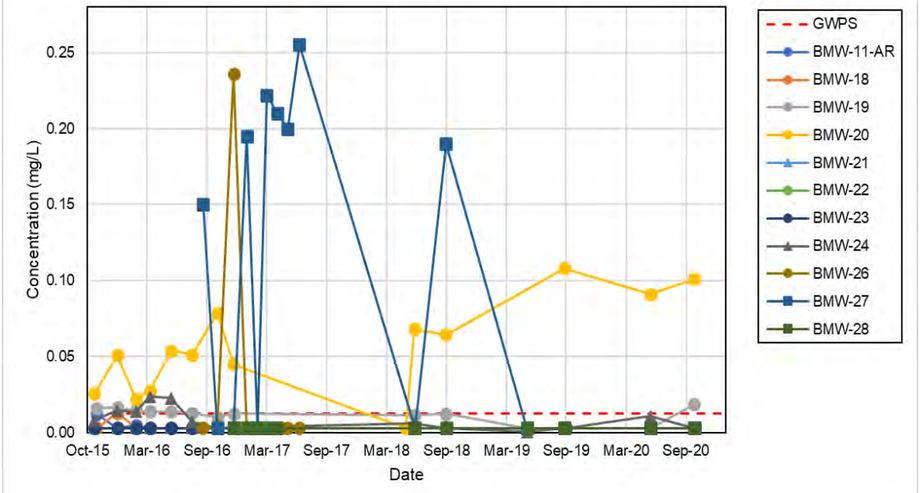
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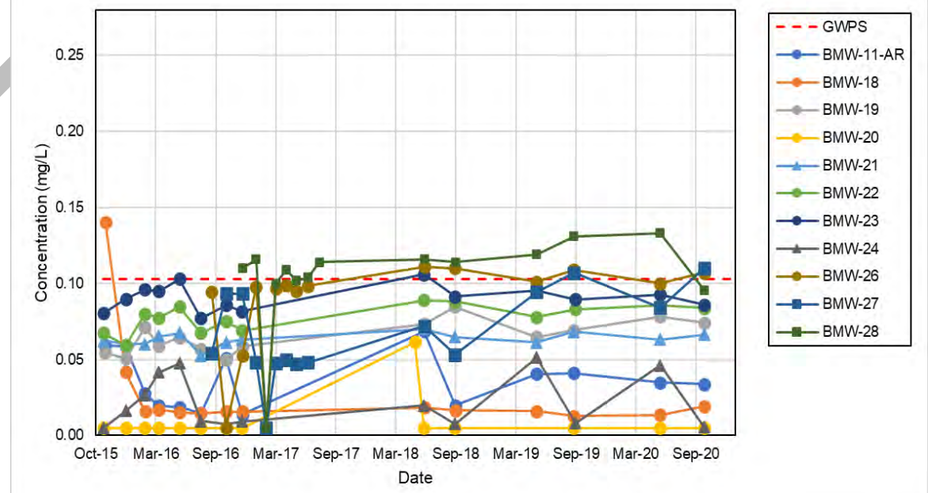
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(c)



(d)



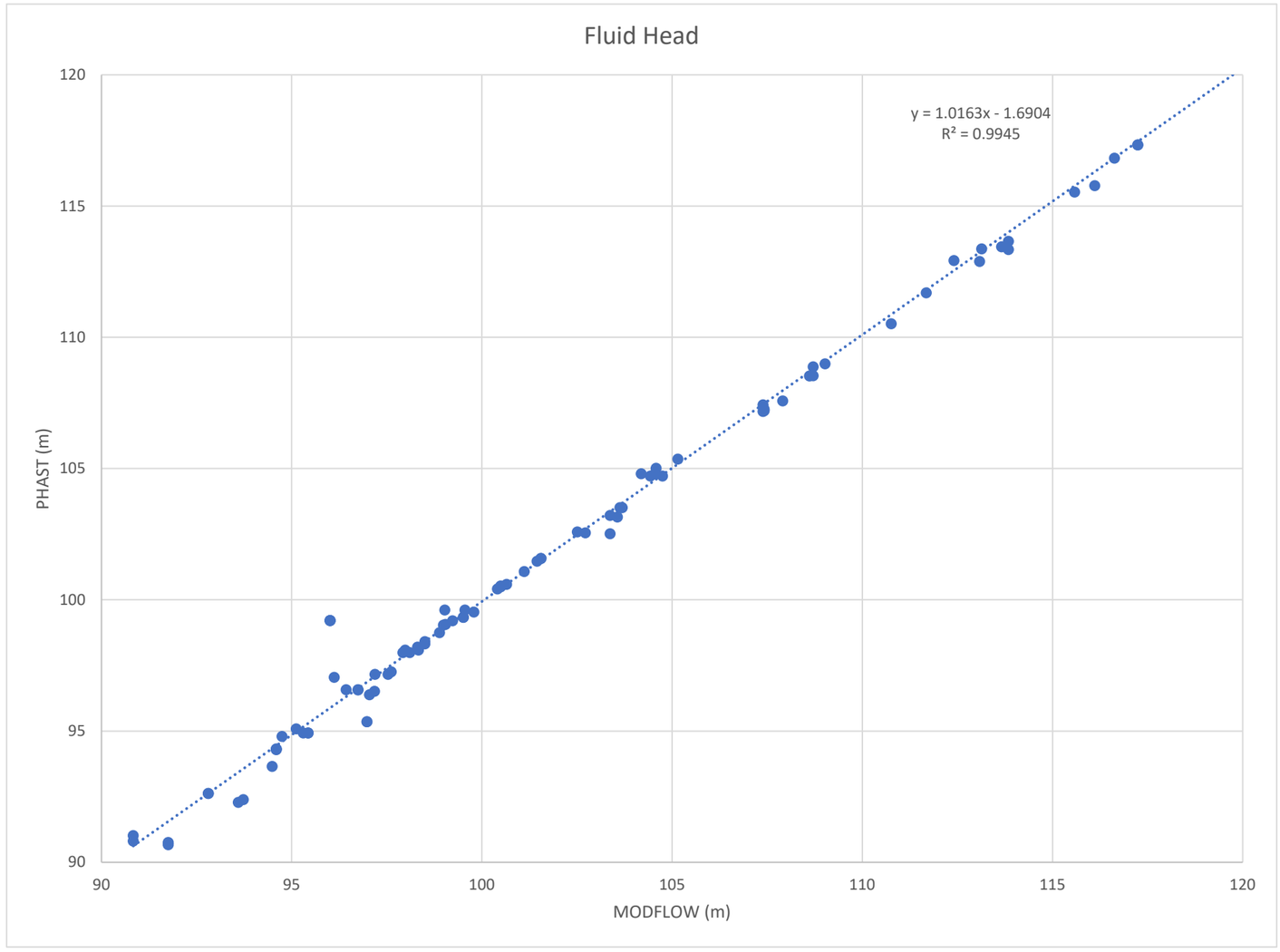
CLIENT
LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

CONSULTANT
GOLDER

PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

TITLE
CONSTITUENT TRENDS

PROJECT NO.	PHASE	REV.	FIGURE
19134019	3000		1



CLIENT
LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

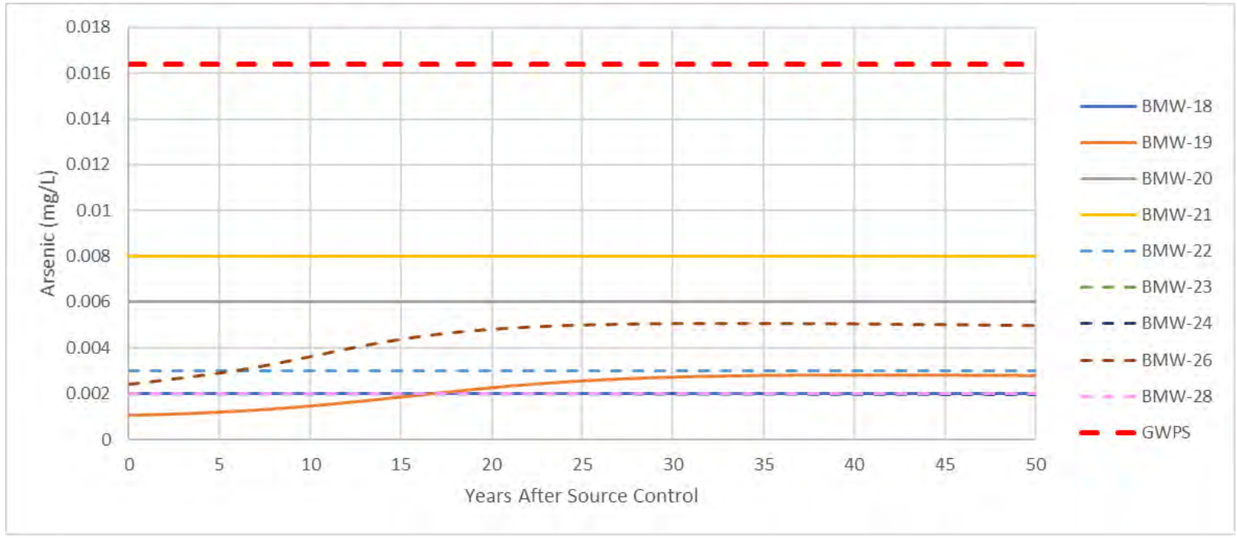
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PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

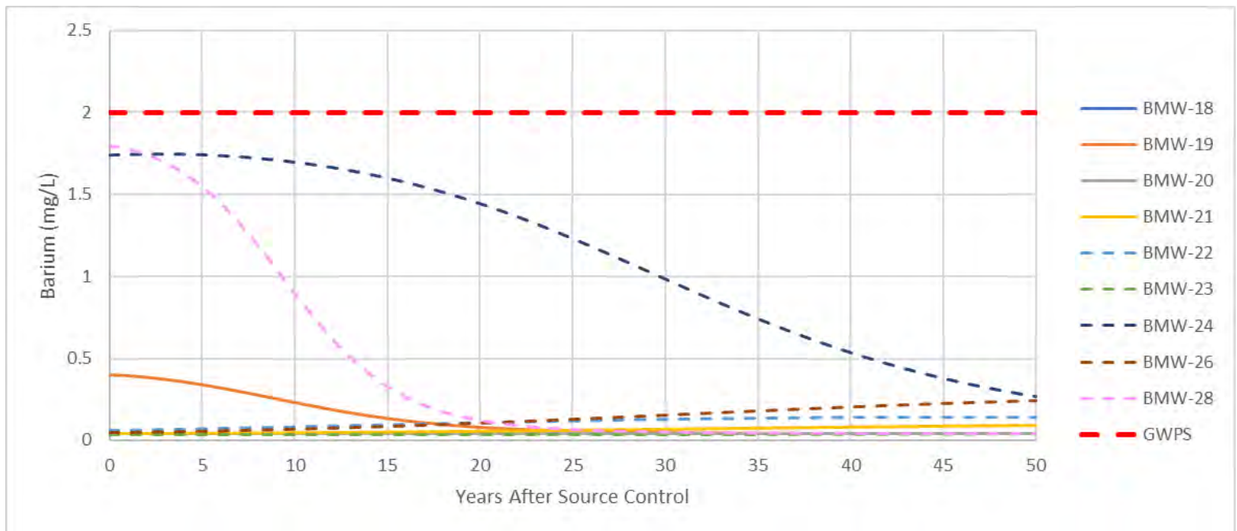
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PHAST FLUID HEAD CALIBRATION

PROJECT NO.	PHASE	REV.	FIGURE
19134019	3000	A	2

(3)



(4)



CLIENT
LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

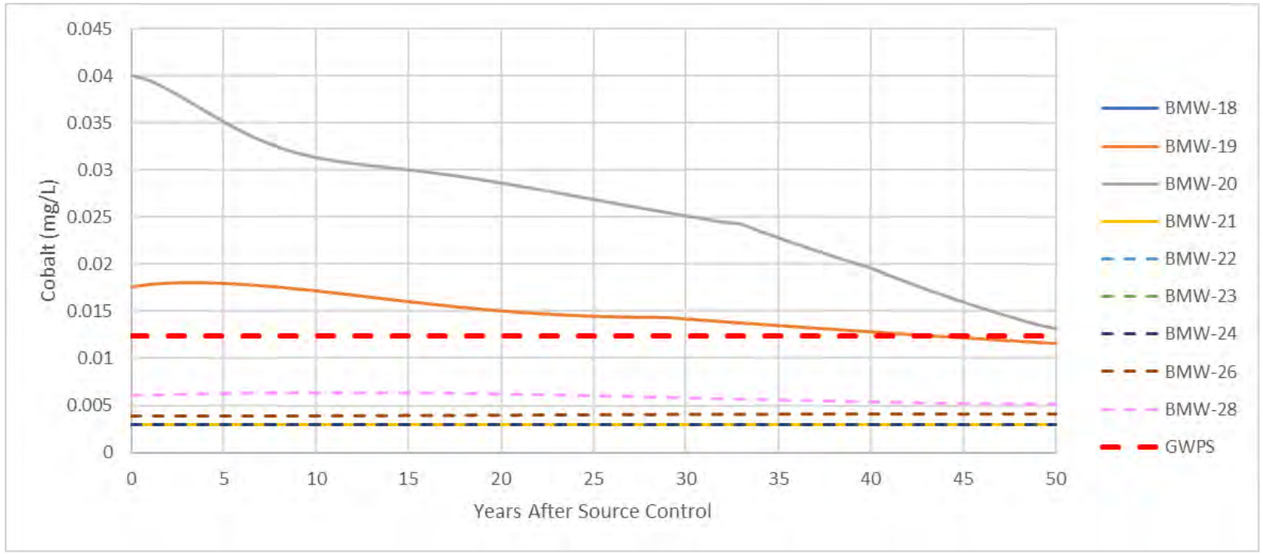
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PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

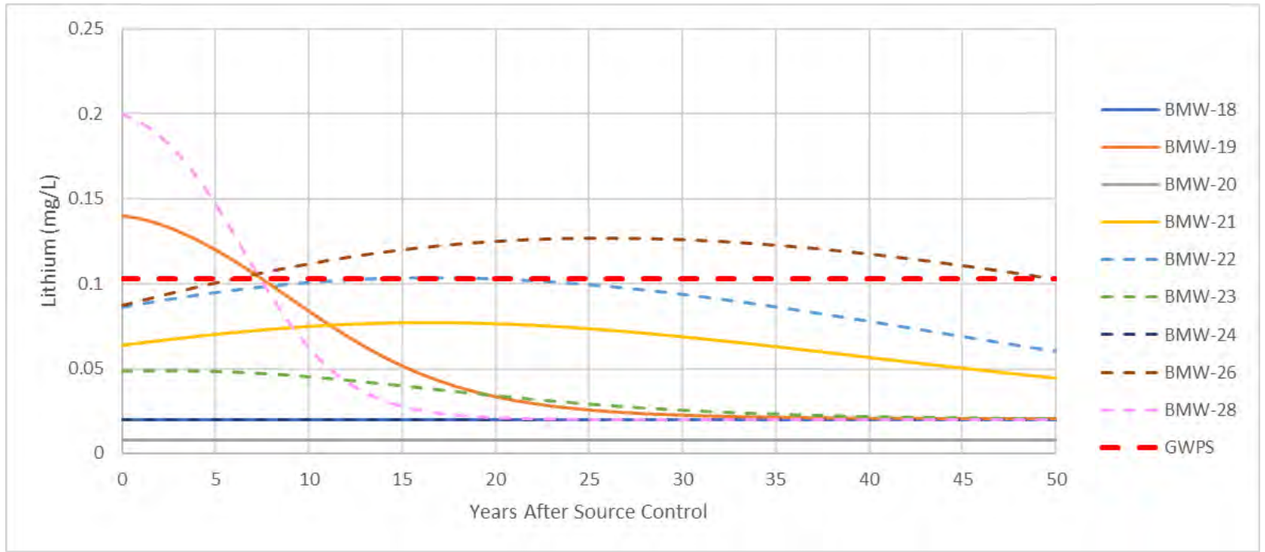
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GEOCHEMICAL MODELING RESULTS FOR (3) ARSENIC AND (4) BARIUM

PROJECT NO.	PHASE	REV.	FIGURE
19134019	3000	A	3&4

(5)



(6)



CLIENT
LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

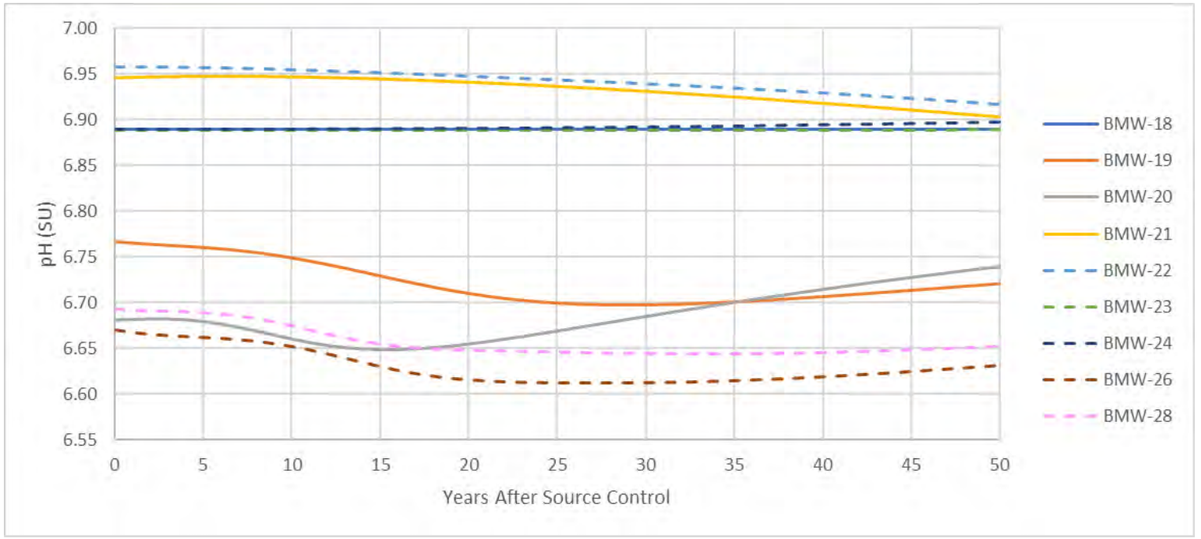
CONSULTANT
GOLDER

PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

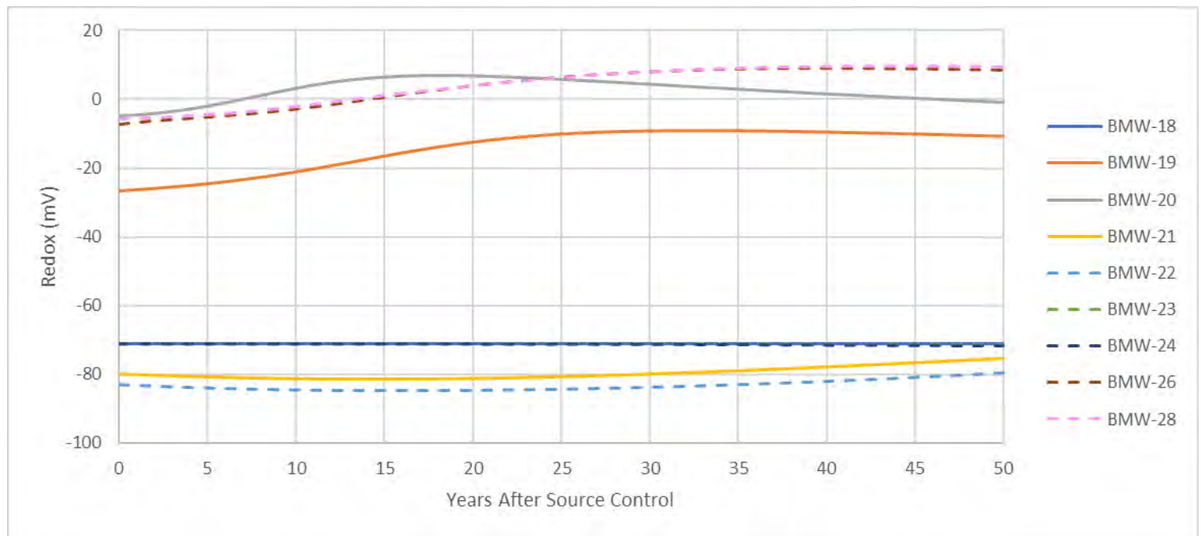
TITLE
GEOCHEMICAL MODELING RESULTS FOR (5) COBALT AND (6) LITHIUM

PROJECT NO.	PHASE	REV.	FIGURE
19134019	3000	A	**5&6**

(7)



(8)



CLIENT
LUMINANT
MARTIN LAKE SES
A1 LANDFILL AREA

CONSULTANT
GOLDER

PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

TITLE
GEOCHEMICAL MODELING RESULTS FOR (7) pH AND (8) REDOX

PROJECT NO.	PHASE	REV.	FIGURE
19134019	3000	A	7&8

APPENDIX A

Laboratory Analytical Reports

October 10, 2019

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

Order No.: 1909049

RE: Luminant-A1 Area Landfill MLSES

Dear Will Vienne:

DHL Analytical, Inc. received 8 sample(s) on 9/6/2019 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

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WorkOrderSampleSummary 1909049 13

PrepDatesReport 1909049 14

AnalyticalDatesReport 1909049 16

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MQLSummaryReport 1909049 40

Subcontract Report 1909049 41

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*

№ 85533

CHAIN-OF-CUSTODY

CLIENT: GOLDER
ADDRESS: 2201 DOUBLE CREEK DR #4004 ROUND ROCK, TX 78664
PHONE: 512-671-3134 FAX/E-MAIL:
DATA REPORTED TO: WILL VIENNE
ADDITIONAL REPORT COPIES TO:

DATE: 9-4-19 PAGE 1 OF 1
PO #: 19122262-D DHL WORK ORDER #: 1908 1909049
PROJECT LOCATION OR NAME: LUMINANT - A1 AREA LANDFILL
CLENT PROJECT #: 19122262-D COLLECTOR: J. BRAUTON

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

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
BMW-21	01	9-4-19	0800	W	P	4		X		X	X	APPENDIX III & IV	
BMW-20	02		0850	W	P	4		X		X	X		
BMW-27	03		0940	W	P	4		X		X	X		
BMW-26	04		1030	W	P	4		X		X	X		
BMW-11AR	05		1130	W	P	4		X		X	X		
BMW-19	06		1220	W	P	4		X		X	X		
BMW-18	07		1320	W	P	4		X		X	X		
BMW-29	08		1420	W	P	4		X		X	X		

RELINQUISHED BY: (Signature) DATE/TIME 9-5-19 RECEIVED BY: (Signature) FEDEX
RELINQUISHED BY: (Signature) FEDEX DATE/TIME 9-10-19 0950 RECEIVED BY: (Signature) Jaden Viner
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: 3.7/3.0 °C THERM #: 18
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

Eric Lau

From: Vienne, Will <William_Vienne@golder.com>
Sent: Tuesday, September 10, 2019 2:25 PM
To: Eric Lau
Cc: John DuPont
Subject: RE: Luminant CCR Bottle Order

Follow Up Flag: Follow up
Flag Status: Completed

Eric and John,

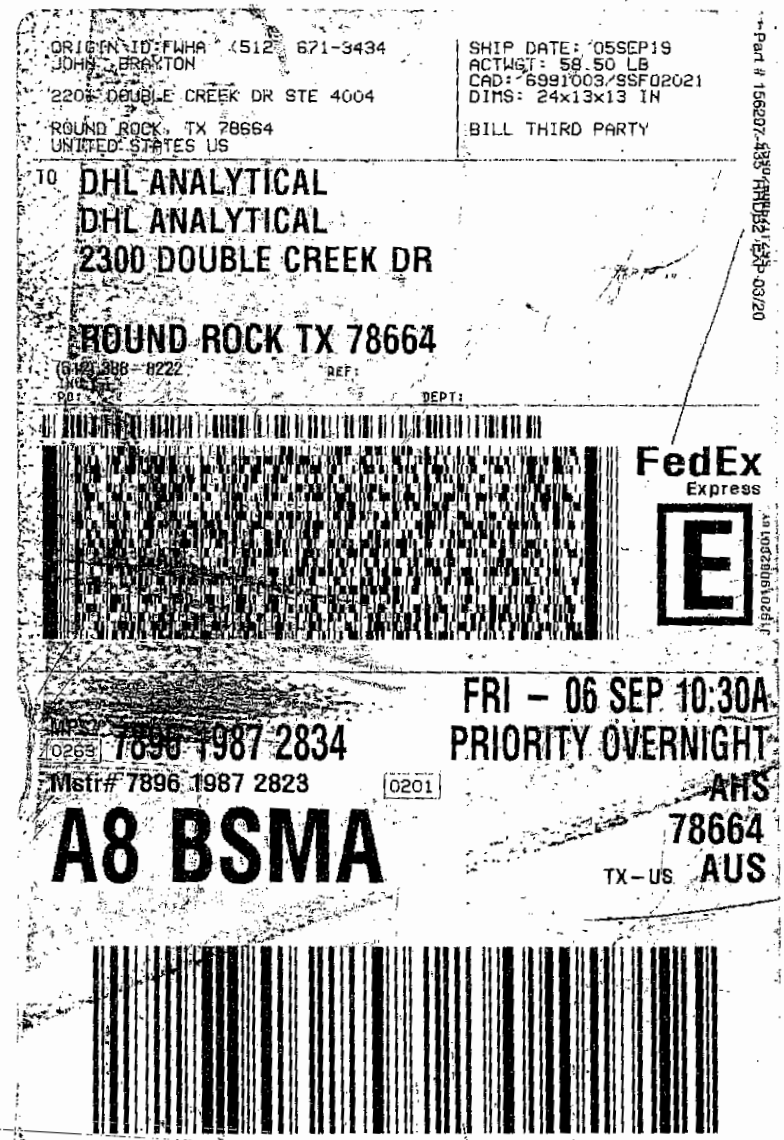
We don't have to analyze for all of the Appendix IV parameters during the current sampling period for the sites listed below. Here is a list of the analytes that **shouldn't** be reported for each site:

- Martin Lake A1 Area Landfill: Sb, Be, Cd, Cr, Pb, Hg, Se, and Tl

William Vienne
Senior Hydrogeologist

GOLDER

Golder Associates Inc.
2201 Double Creek Dr, Suite 4004, Round Rock, Texas, USA 78664
T: +1 512 671-3434 | **C:** +1 512 466-9074 | **golder.com**
LinkedIn | Facebook | Twitter



ORIGIN ID:FWHA (512) 671-3434
JOHN BRAXTON
2200 DOUBLE CREEK DR STE 4004
ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 05SEP19
ACTWGT: 58.50 LB
CAD: 6991003/SSF02021
DIMS: 24x13x13 IN

BILL THIRD PARTY

TO DHL ANALYTICAL
DHL ANALYTICAL
2300 DOUBLE CREEK DR

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

FedEx Express

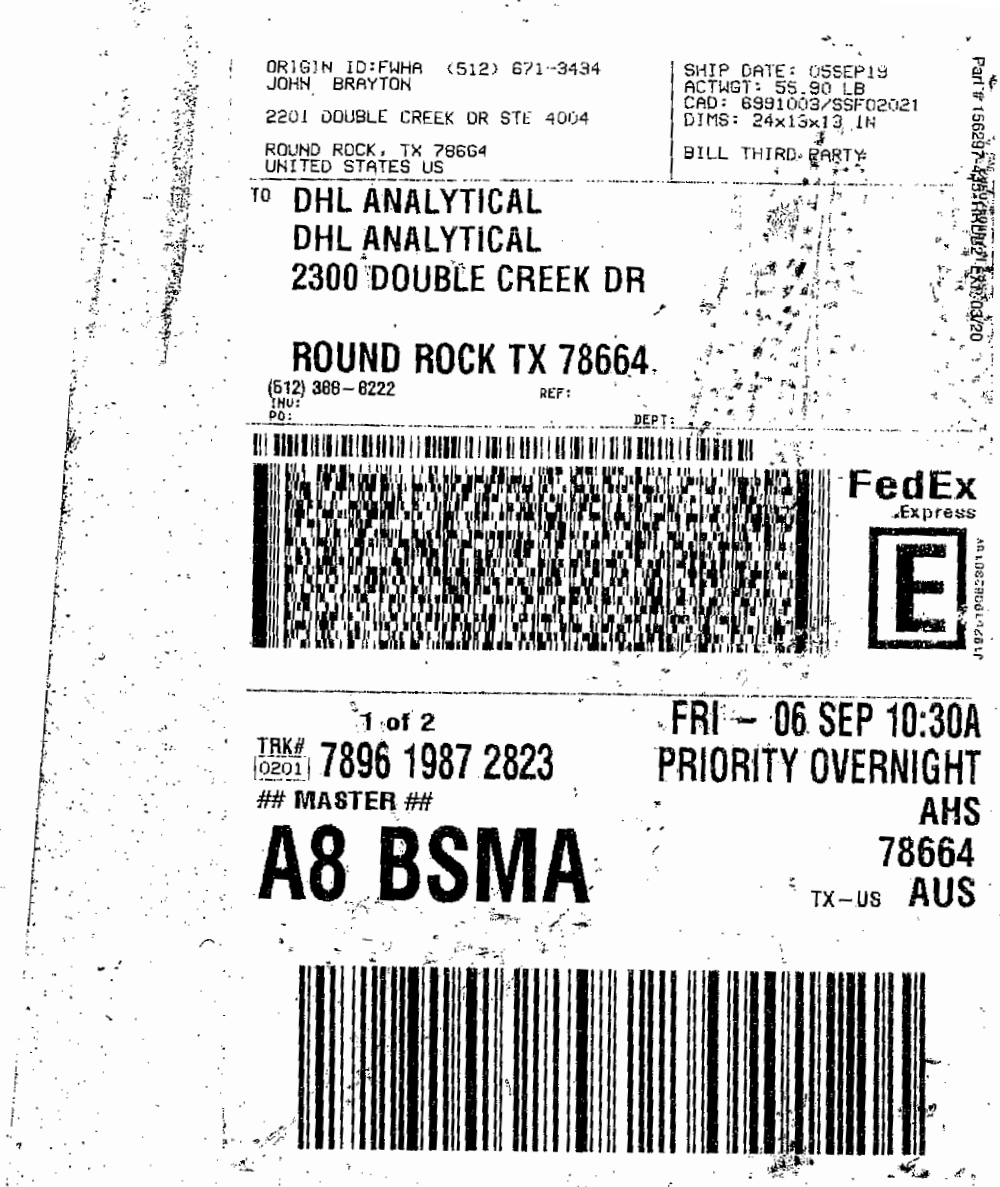
FRI - 06 SEP 10:30A
PRIORITY OVERNIGHT

MPS# 7896 1987 2834
0269
Mstr# 7896 1987 2823
0201

AHS
78664
TX-US AUS

A8 BSMA

Part # 156207-439 RRD22 1/20



ORIGIN ID:FWHA (512) 671-3434
JOHN BRAYTON

2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 05SEP19
ACTWGT: 55.90 LB
CAD: 6991003/SSF02021
DIMS: 24x13x13 IN

BILL THIRD PARTY

Part # 156297-435-ROUND1 EXP 03/20

TO DHL ANALYTICAL
DHL ANALYTICAL
2300 DOUBLE CREEK DR

ROUND ROCK TX 78664

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

FedEx Express

1 of 2

TRK# 0201 7896 1987 2823

MASTER

A8 BSMA

FRI - 06 SEP 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

Sample Receipt Checklist

Client Name Golder | Date Received: 9/6/2019

Work Order Number 1909049 | Received by JW

Checklist completed by: Signature | 9/6/2019 Date | Reviewed by Initials | 9/6/2019 Date

Carrier name FedEx 1day

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	3.7 °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

Page 1 of 1

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist: Reportable Data

Project Name: Luminant-A1 Area Landfill MLSES	**LRC Date:** 10/10/19
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 1909049
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-A1 Area Landfill MLSES	**LRC Date:** 10/10/19
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 1909049
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**			**S2-02**
		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

10/10/19

Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *10-Oct-19*

CLIENT: Golder
Project: Luminant-A1 Area Landfill MLSES
Lab Order: 1909049

CASE NARRATIVE

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

Method SW6020A - Metals 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 9/6/19. A total of 8 samples were received. The samples arrived in good condition and were properly packaged.

Exception Report R7-03

For Metals analysis performed on 9/13/19 and 9/16/19 the matrix spike and matrix spike duplicate recoveries were out of control limits for Boron and/or Calcium. 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.

For Anions analysis performed on 9/10/19 the matrix spike and matrix spike duplicate recoveries were slightly below control limits for Chloride. These are flagged accordingly. 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 S2-02

For Metals analysis performed on 9/13/19 LCVL4-190913 and LCVL5-190913 were above control limits for Calcium. These are flagged accordingly in the QC summary report. The associated CCVs were within control limits for this analyte. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *10-Oct-19*

CLIENT: Golder
Project: Luminant-A1 Area Landfill MLSES
Lab Order: 1909049

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1909049-01	BMW-21		09/04/19 08:00 AM	9/6/2019
1909049-02	BMW-20		09/04/19 08:50 AM	9/6/2019
1909049-03	BMW-27		09/04/19 09:40 AM	9/6/2019
1909049-04	BMW-26		09/04/19 10:30 AM	9/6/2019
1909049-05	BMW-11AR		09/04/19 11:30 AM	9/6/2019
1909049-06	BMW-19		09/04/19 12:20 PM	9/6/2019
1909049-07	BMW-18		09/04/19 01:20 PM	9/6/2019
1909049-08	BMW-28		09/04/19 02:20 PM	9/6/2019

Lab Order: 1909049
Client: Golder
Project: Luminant-A1 Area Landfill MLSE

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1909049-01A	BMW-21	09/04/19 08:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-21	09/04/19 08:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
1909049-01B	BMW-21	09/04/19 08:00 AM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-21	09/04/19 08:00 AM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-21	09/04/19 08:00 AM	Aqueous	M2540C	TDS Preparation	09/09/19 11:00 AM	92719
1909049-02A	BMW-20	09/04/19 08:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-20	09/04/19 08:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-20	09/04/19 08:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
1909049-02B	BMW-20	09/04/19 08:50 AM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-20	09/04/19 08:50 AM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-20	09/04/19 08:50 AM	Aqueous	M2540C	TDS Preparation	09/09/19 11:00 AM	92719
1909049-03A	BMW-27	09/04/19 09:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-27	09/04/19 09:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-27	09/04/19 09:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
1909049-03B	BMW-27	09/04/19 09:40 AM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-27	09/04/19 09:40 AM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-27	09/04/19 09:40 AM	Aqueous	M2540C	TDS Preparation	09/09/19 11:00 AM	92719
1909049-04A	BMW-26	09/04/19 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-26	09/04/19 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-26	09/04/19 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
1909049-04B	BMW-26	09/04/19 10:30 AM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-26	09/04/19 10:30 AM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-26	09/04/19 10:30 AM	Aqueous	M2540C	TDS Preparation	09/09/19 11:00 AM	92719
1909049-05A	BMW-11AR	09/04/19 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-11AR	09/04/19 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-11AR	09/04/19 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
1909049-05B	BMW-11AR	09/04/19 11:30 AM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-11AR	09/04/19 11:30 AM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717

Lab Order: 1909049
Client: Golder
Project: Luminant-A1 Area Landfill MLSE

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1909049-05B	BMW-11AR	09/04/19 11:30 AM	Aqueous	M2540C	TDS Preparation	09/09/19 11:00 AM	92719
1909049-06A	BMW-19	09/04/19 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-19	09/04/19 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-19	09/04/19 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
1909049-06B	BMW-19	09/04/19 12:20 PM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-19	09/04/19 12:20 PM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-19	09/04/19 12:20 PM	Aqueous	M2540C	TDS Preparation	09/09/19 11:00 AM	92719
1909049-07A	BMW-18	09/04/19 01:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-18	09/04/19 01:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
1909049-07B	BMW-18	09/04/19 01:20 PM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-18	09/04/19 01:20 PM	Aqueous	M2540C	TDS Preparation	09/09/19 11:00 AM	92719
1909049-08A	BMW-28	09/04/19 02:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-28	09/04/19 02:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
	BMW-28	09/04/19 02:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/10/19 08:34 AM	92722
1909049-08B	BMW-28	09/04/19 02:20 PM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-28	09/04/19 02:20 PM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-28	09/04/19 02:20 PM	Aqueous	E300	Anion Preparation	09/10/19 08:47 AM	92717
	BMW-28	09/04/19 02:20 PM	Aqueous	M2540C	TDS Preparation	09/09/19 11:00 AM	92719

Lab Order: 1909049
Client: Golder
Project: Luminant-A1 Area Landfill MLSE

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1909049-01A	BMW-21	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/13/19 04:50 PM	ICP-MS5_190913B
	BMW-21	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	10	09/16/19 12:28 PM	ICP-MS4_190916A
1909049-01B	BMW-21	Aqueous	E300	Anions by IC method - Water	92717	10	09/10/19 11:30 AM	IC2_190910A
	BMW-21	Aqueous	E300	Anions by IC method - Water	92717	1	09/10/19 01:38 PM	IC2_190910A
	BMW-21	Aqueous	M2540C	Total Dissolved Solids	92719	1	09/09/19 03:45 PM	WC_190909C
1909049-02A	BMW-20	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	10	09/16/19 12:30 PM	ICP-MS4_190916A
	BMW-20	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/16/19 12:32 PM	ICP-MS4_190916A
	BMW-20	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/13/19 04:52 PM	ICP-MS5_190913B
1909049-02B	BMW-20	Aqueous	E300	Anions by IC method - Water	92717	10	09/10/19 12:18 PM	IC2_190910A
	BMW-20	Aqueous	E300	Anions by IC method - Water	92717	1	09/10/19 01:54 PM	IC2_190910A
	BMW-20	Aqueous	M2540C	Total Dissolved Solids	92719	1	09/09/19 03:45 PM	WC_190909C
1909049-03A	BMW-27	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/13/19 04:54 PM	ICP-MS5_190913B
	BMW-27	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	50	09/16/19 12:34 PM	ICP-MS4_190916A
	BMW-27	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/16/19 12:36 PM	ICP-MS4_190916A
1909049-03B	BMW-27	Aqueous	E300	Anions by IC method - Water	92717	10	09/10/19 12:34 PM	IC2_190910A
	BMW-27	Aqueous	E300	Anions by IC method - Water	92717	1	09/10/19 03:30 PM	IC2_190910A
	BMW-27	Aqueous	M2540C	Total Dissolved Solids	92719	1	09/09/19 03:45 PM	WC_190909C
1909049-04A	BMW-26	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	50	09/16/19 12:38 PM	ICP-MS4_190916A
	BMW-26	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/16/19 12:40 PM	ICP-MS4_190916A
	BMW-26	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/13/19 04:56 PM	ICP-MS5_190913B
1909049-04B	BMW-26	Aqueous	E300	Anions by IC method - Water	92717	10	09/10/19 12:50 PM	IC2_190910A
	BMW-26	Aqueous	E300	Anions by IC method - Water	92717	1	09/10/19 03:46 PM	IC2_190910A
	BMW-26	Aqueous	M2540C	Total Dissolved Solids	92719	1	09/09/19 03:45 PM	WC_190909C
1909049-05A	BMW-11AR	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/16/19 01:13 PM	ICP-MS4_190916A
	BMW-11AR	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/13/19 04:45 PM	ICP-MS5_190913B
	BMW-11AR	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	10	09/16/19 12:24 PM	ICP-MS4_190916A
1909049-05B	BMW-11AR	Aqueous	E300	Anions by IC method - Water	92717	10	09/10/19 01:06 PM	IC2_190910A
	BMW-11AR	Aqueous	E300	Anions by IC method - Water	92717	1	09/10/19 04:02 PM	IC2_190910A

Lab Order: 1909049
Client: Golder
Project: Luminant-A1 Area Landfill MLSE

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1909049-05B	BMW-11AR	Aqueous	M2540C	Total Dissolved Solids	92719	1	09/09/19 03:45 PM	WC_190909C
1909049-06A	BMW-19	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	50	09/16/19 12:42 PM	ICP-MS4_190916A
	BMW-19	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/16/19 12:44 PM	ICP-MS4_190916A
	BMW-19	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/13/19 04:59 PM	ICP-MS5_190913B
1909049-06B	BMW-19	Aqueous	E300	Anions by IC method - Water	92717	1	09/10/19 04:18 PM	IC2_190910A
	BMW-19	Aqueous	E300	Anions by IC method - Water	92717	100	09/10/19 10:58 AM	IC2_190910A
	BMW-19	Aqueous	M2540C	Total Dissolved Solids	92719	1	09/09/19 03:45 PM	WC_190909C
1909049-07A	BMW-18	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/13/19 05:01 PM	ICP-MS5_190913B
	BMW-18	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/16/19 01:23 PM	ICP-MS4_190916A
1909049-07B	BMW-18	Aqueous	E300	Anions by IC method - Water	92717	1	09/10/19 04:34 PM	IC2_190910A
	BMW-18	Aqueous	M2540C	Total Dissolved Solids	92719	1	09/09/19 03:45 PM	WC_190909C
1909049-08A	BMW-28	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	50	09/16/19 01:25 PM	ICP-MS4_190916A
	BMW-28	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	10	09/16/19 01:27 PM	ICP-MS4_190916A
	BMW-28	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92722	1	09/13/19 05:03 PM	ICP-MS5_190913B
1909049-08B	BMW-28	Aqueous	E300	Anions by IC method - Water	92717	100	09/10/19 11:14 AM	IC2_190910A
	BMW-28	Aqueous	E300	Anions by IC method - Water	92717	10	09/10/19 01:22 PM	IC2_190910A
	BMW-28	Aqueous	E300	Anions by IC method - Water	92717	1	09/10/19 04:50 PM	IC2_190910A
	BMW-28	Aqueous	M2540C	Total Dissolved Solids	92719	1	09/09/19 03:45 PM	WC_190909C

DHL Analytical, Inc.

Date: *10-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-21
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909049-01
Project No:	19122262-D	**Collection Date:**	09/04/19 08:00 AM
Lab Order:	1909049	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	0.00378	0.00200	0.00500	J	mg/L	1	09/13/19 04:50 PM
Barium	0.0409	0.00300	0.0100		mg/L	1	09/13/19 04:50 PM
Boron	1.10	0.100	0.300		mg/L	10	09/16/19 12:28 PM
Calcium	152	1.00	3.00		mg/L	10	09/16/19 12:28 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	09/13/19 04:50 PM
Lithium	0.0683	0.00500	0.0100		mg/L	1	09/13/19 04:50 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 04:50 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	426	3.00	10.0		mg/L	10	09/10/19 11:30 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	09/10/19 01:38 PM
Sulfate	477	10.0	30.0		mg/L	10	09/10/19 11:30 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2090	50.0	50.0		mg/L	1	09/09/19 03:45 PM

Qualifiers:

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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-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-20
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909049-02
Project No:	19122262-D	**Collection Date:**	09/04/19 08:50 AM
Lab Order:	1909049	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	0.00768	0.00200	0.00500		mg/L	1	09/13/19 04:52 PM
Barium	0.0261	0.00300	0.0100		mg/L	1	09/13/19 04:52 PM
Boron	0.101	0.0100	0.0300		mg/L	1	09/16/19 12:32 PM
Calcium	136	1.00	3.00		mg/L	10	09/16/19 12:30 PM
Cobalt	0.108	0.00300	0.00500		mg/L	1	09/13/19 04:52 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	09/13/19 04:52 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 04:52 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	50.7	3.00	10.0		mg/L	10	09/10/19 12:18 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	09/10/19 01:54 PM
Sulfate	1160	10.0	30.0		mg/L	10	09/10/19 12:18 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1830	50.0	50.0		mg/L	1	09/09/19 03:45 PM

Qualifiers:

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DF- Dilution Factor
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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-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-27
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909049-03
Project No:	19122262-D	**Collection Date:**	09/04/19 09:40 AM
Lab Order:	1909049	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	0.00759	0.00200	0.00500		mg/L	1	09/13/19 04:54 PM
Barium	0.0320	0.00300	0.0100		mg/L	1	09/13/19 04:54 PM
Boron	0.463	0.0100	0.0300		mg/L	1	09/16/19 12:36 PM
Calcium	257	5.00	15.0		mg/L	50	09/16/19 12:34 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	09/13/19 04:54 PM
Lithium	0.107	0.00500	0.0100		mg/L	1	09/13/19 04:54 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 04:54 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	141	3.00	10.0		mg/L	10	09/10/19 12:34 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	09/10/19 03:30 PM
Sulfate	755	10.0	30.0		mg/L	10	09/10/19 12:34 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2130	50.0	50.0		mg/L	1	09/09/19 03:45 PM

Qualifiers:

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- DF- Dilution Factor
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- 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-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-26
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909049-04
Project No:	19122262-D	**Collection Date:**	09/04/19 10:30 AM
Lab Order:	1909049	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	0.00725	0.00200	0.00500		mg/L	1	09/13/19 04:56 PM
Barium	0.0317	0.00300	0.0100		mg/L	1	09/13/19 04:56 PM
Boron	0.473	0.0100	0.0300		mg/L	1	09/16/19 12:40 PM
Calcium	262	5.00	15.0		mg/L	50	09/16/19 12:38 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	09/13/19 04:56 PM
Lithium	0.109	0.00500	0.0100		mg/L	1	09/13/19 04:56 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 04:56 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	140	3.00	10.0		mg/L	10	09/10/19 12:50 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	09/10/19 03:46 PM
Sulfate	753	10.0	30.0		mg/L	10	09/10/19 12:50 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2170	50.0	50.0		mg/L	1	09/09/19 03:45 PM

Qualifiers:

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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-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-11AR
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909049-05
Project No:	19122262-D	**Collection Date:**	09/04/19 11:30 AM
Lab Order:	1909049	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 04:45 PM
Barium	0.0393	0.00300	0.0100		mg/L	1	09/13/19 04:45 PM
Boron	0.368	0.0100	0.0300		mg/L	1	09/16/19 01:13 PM
Calcium	149	1.00	3.00		mg/L	10	09/16/19 12:24 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	09/13/19 04:45 PM
Lithium	0.0411	0.00500	0.0100		mg/L	1	09/13/19 04:45 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 04:45 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	6.41	0.300	1.00		mg/L	1	09/10/19 04:02 PM
Fluoride	0.170	0.100	0.400	J	mg/L	1	09/10/19 04:02 PM
Sulfate	356	10.0	30.0		mg/L	10	09/10/19 01:06 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1090	50.0	50.0		mg/L	1	09/09/19 03:45 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: *10-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-19
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909049-06
Project No:	19122262-D	**Collection Date:**	09/04/19 12:20 PM
Lab Order:	1909049	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 04:59 PM
Barium	0.0117	0.00300	0.0100		mg/L	1	09/13/19 04:59 PM
Boron	0.430	0.0100	0.0300		mg/L	1	09/16/19 12:44 PM
Calcium	434	5.00	15.0		mg/L	50	09/16/19 12:42 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	09/13/19 04:59 PM
Lithium	0.0694	0.00500	0.0100		mg/L	1	09/13/19 04:59 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 04:59 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	5.93	0.300	1.00		mg/L	1	09/10/19 04:18 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	09/10/19 04:18 PM
Sulfate	2010	100	300		mg/L	100	09/10/19 10:58 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3320	50.0	50.0		mg/L	1	09/09/19 03:45 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
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DHL Analytical, Inc.

Date: *10-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-18
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909049-07
Project No:	19122262-D	**Collection Date:**	09/04/19 01:20 PM
Lab Order:	1909049	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 05:01 PM
Barium	0.0337	0.00300	0.0100		mg/L	1	09/13/19 05:01 PM
Boron	0.435	0.0100	0.0300		mg/L	1	09/16/19 01:23 PM
Calcium	7.72	0.100	0.300		mg/L	1	09/13/19 05:01 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	09/13/19 05:01 PM
Lithium	0.0128	0.00500	0.0100		mg/L	1	09/13/19 05:01 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 05:01 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	19.2	0.300	1.00		mg/L	1	09/10/19 04:34 PM
Fluoride	0.203	0.100	0.400	J	mg/L	1	09/10/19 04:34 PM
Sulfate	91.8	1.00	3.00		mg/L	1	09/10/19 04:34 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	478	10.0	10.0		mg/L	1	09/09/19 03:45 PM

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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: *10-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-28
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909049-08
Project No:	19122262-D	**Collection Date:**	09/04/19 02:20 PM
Lab Order:	1909049	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 05:03 PM
Barium	0.0270	0.00300	0.0100		mg/L	1	09/13/19 05:03 PM
Boron	1.22	0.100	0.300		mg/L	10	09/16/19 01:27 PM
Calcium	277	5.00	15.0		mg/L	50	09/16/19 01:25 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	09/13/19 05:03 PM
Lithium	0.131	0.00500	0.0100		mg/L	1	09/13/19 05:03 PM
Molybdenum	0.00961	0.00200	0.00500		mg/L	1	09/13/19 05:03 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	137	3.00	10.0		mg/L	10	09/10/19 01:22 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	09/10/19 04:50 PM
Sulfate	1720	100	300		mg/L	100	09/10/19 11:14 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3470	50.0	50.0		mg/L	1	09/09/19 03:45 PM

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SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

CLIENT: Golder
Work Order: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190621B

Sample ID **DCS2-91398**	Batch ID: **91398**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **DCS2**	Run ID: **ICP-MS4_190621B**	Analysis Date: **6/21/2019 1:24:00 PM**	Prep Date: **6/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.321	0.300	0.300	0	107	70	130	0	0	

Sample ID **DCS4-91398**	Batch ID: **91398**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **DCS4**	Run ID: **ICP-MS4_190621B**	Analysis Date: **6/21/2019 1:30:00 PM**	Prep Date: **6/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0311	0.0300	0.0300	0	104	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190916A**

The QC data in batch 92722 applies to the following samples: 1909049-01A, 1909049-02A, 1909049-03A, 1909049-04A, 1909049-05A, 1909049-06A, 1909049-07A, 1909049-08A

Sample ID	**MB-92722**	Batch ID:	**92722**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS4_190916A**	Analysis Date:	**9/16/2019 12:16:00 PM**	Prep Date:	**9/10/2019**

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

Sample ID	**LCS-92722**	Batch ID:	**92722**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS4_190916A**	Analysis Date:	**9/16/2019 12:18:00 PM**	Prep Date:	**9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.209	0.0300	0.200	0	105	80	120			

Sample ID	**LCSD-92722**	Batch ID:	**92722**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS4_190916A**	Analysis Date:	**9/16/2019 12:20:00 PM**	Prep Date:	**9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.209	0.0300	0.200	0	105	80	120	0.016	15	

Sample ID	**1909049-05A SD**	Batch ID:	**92722**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_190916A**	Analysis Date:	**9/16/2019 12:26:00 PM**	Prep Date:	**9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	150	15.0	0	149				0.934	10	

Sample ID	**1909049-05A PDS**	Batch ID:	**92722**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_190916A**	Analysis Date:	**9/16/2019 12:46:00 PM**	Prep Date:	**9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	205	3.00	50.0	149	113	80	120			

Sample ID	**1909049-05A MS**	Batch ID:	**92722**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS4_190916A**	Analysis Date:	**9/16/2019 12:48:00 PM**	Prep Date:	**9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.612	0.300	0.200	0.369	122	80	120			S

Sample ID	**1909049-05A MSD**	Batch ID:	**92722**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS4_190916A**	Analysis Date:	**9/16/2019 12:50:00 PM**	Prep Date:	**9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.604	0.300	0.200	0.369	118	80	120	1.33	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190916A

Sample ID **1909049-05A SD**	Batch ID: **92722**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 1:19:00 PM**	Prep Date: **9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.395	0.150	0	0.368				7.05	10	

Sample ID **1909049-05A PDS**	Batch ID: **92722**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 1:21:00 PM**	Prep Date: **9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.533	0.0300	0.200	0.368	82.2	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190916A

Sample ID **ICV-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 10:41:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.107	0.0300	0.100	0	107	90	110			
Calcium	2.60	0.300	2.50	0	104	90	110			

Sample ID **LCVL-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 10:53:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0203	0.0300	0.0200	0	101	70	130			
Calcium	0.101	0.300	0.100	0	101	70	130			

Sample ID **CCV2-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 11:58:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.205	0.0300	0.200	0	103	90	110			
Calcium	4.96	0.300	5.00	0	99.2	90	110			

Sample ID **LCVL2-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 12:05:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0229	0.0300	0.0200	0	114	70	130			
Calcium	0.112	0.300	0.100	0	112	70	130			

Sample ID **CCV3-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 12:52:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.215	0.0300	0.200	0	108	90	110			
Calcium	4.91	0.300	5.00	0	98.3	90	110			

Sample ID **LCVL3-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 1:07:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0229	0.0300	0.0200	0	115	70	130			
Calcium	0.105	0.300	0.100	0	105	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190916A

Sample ID **CCV4-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 1:29:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.216	0.0300	0.200	0	108	90	110			
Calcium	4.92	0.300	5.00	0	98.5	90	110			

Sample ID **LCVL4-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 1:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0225	0.0300	0.0200	0	113	70	130			
Calcium	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190621A

Sample ID **DCS2-91398**	Batch ID: **91398**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **DCS2**	Run ID: **ICP-MS5_190621A**	Analysis Date: **6/21/2019 11:14:00 AM**	Prep Date: **6/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.305	0.300	0.300	0	102	70	130	0	0	

Sample ID **DCS3-91398**	Batch ID: **91398**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **DCS3**	Run ID: **ICP-MS5_190621A**	Analysis Date: **6/21/2019 11:16:00 AM**	Prep Date: **6/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00512	0.00500	0.00500	0	102	70	130	0	0	
Barium	0.00506	0.0100	0.00500	0	101	70	130	0	0	
Cobalt	0.00516	0.00500	0.00500	0	103	70	130	0	0	
Lithium	0.00535	0.0100	0.00500	0	107	70	130	0	0	
Molybdenum	0.00526	0.00500	0.00500	0	105	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190913B**

The QC data in batch 92722 applies to the following samples: 1909049-01A, 1909049-02A, 1909049-03A, 1909049-04A, 1909049-05A, 1909049-06A, 1909049-07A, 1909049-08A

Sample ID **MB-92722** Batch ID: **92722** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_190913B** Analysis Date: **9/13/2019 4:36:00 PM** Prep Date: **9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Calcium	<0.100	0.300								
Cobalt	<0.00300	0.00500								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								

Sample ID **LCS-92722** Batch ID: **92722** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_190913B** Analysis Date: **9/13/2019 4:39:00 PM** Prep Date: **9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.203	0.00500	0.200	0	101	80	120			
Barium	0.201	0.0100	0.200	0	101	80	120			
Calcium	4.93	0.300	5.00	0	98.6	80	120			
Cobalt	0.196	0.00500	0.200	0	98.2	80	120			
Lithium	0.207	0.0100	0.200	0	103	80	120			
Molybdenum	0.198	0.00500	0.200	0	99.0	80	120			

Sample ID **LCSD-92722** Batch ID: **92722** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_190913B** Analysis Date: **9/13/2019 4:41:00 PM** Prep Date: **9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.202	0.00500	0.200	0	101	80	120	0.457	15	
Barium	0.204	0.0100	0.200	0	102	80	120	1.23	15	
Calcium	5.05	0.300	5.00	0	101	80	120	2.30	15	
Cobalt	0.196	0.00500	0.200	0	97.9	80	120	0.333	15	
Lithium	0.205	0.0100	0.200	0	103	80	120	0.770	15	
Molybdenum	0.197	0.00500	0.200	0	98.4	80	120	0.610	15	

Sample ID **1909049-05A SD** Batch ID: **92722** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_190913B** Analysis Date: **9/13/2019 4:48:00 PM** Prep Date: **9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	<0.0100	0.0250	0	0				0	10	
Barium	0.0380	0.0500	0	0.0393				3.21	10	
Cobalt	<0.0150	0.0250	0	0				0	10	
Lithium	0.0414	0.0500	0	0.0412				0.683	10	
Molybdenum	<0.0100	0.0250	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190913B

Sample ID **1909049-05A PDS**	Batch ID: **92722**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 5:10:00 PM**	Prep Date: **9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.191	0.00500	0.200	0	95.3	80	120			
Barium	0.233	0.0100	0.200	0.0393	96.9	80	120			
Cobalt	0.183	0.00500	0.200	0	91.7	80	120			
Lithium	0.231	0.0100	0.200	0.0411	94.8	80	120			
Molybdenum	0.192	0.00500	0.200	0	96.0	80	120			

Sample ID **1909049-05A MS**	Batch ID: **92722**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 5:12:00 PM**	Prep Date: **9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.198	0.00500	0.200	0	98.9	80	120			
Barium	0.243	0.0100	0.200	0.0393	102	80	120			
Calcium	152	0.300	5.00	149	67.1	80	120			S
Cobalt	0.188	0.00500	0.200	0	93.8	80	120			
Lithium	0.243	0.0100	0.200	0.0411	101	80	120			
Molybdenum	0.203	0.00500	0.200	0	102	80	120			

Sample ID **1909049-05A MSD**	Batch ID: **92722**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 5:14:00 PM**	Prep Date: **9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.199	0.00500	0.200	0	99.4	80	120	0.480	15	
Barium	0.246	0.0100	0.200	0.0393	103	80	120	1.33	15	
Calcium	153	0.300	5.00	149	72.5	80	120	0.178	15	S
Cobalt	0.189	0.00500	0.200	0	94.7	80	120	0.908	15	
Lithium	0.245	0.0100	0.200	0.0411	102	80	120	0.781	15	
Molybdenum	0.205	0.00500	0.200	0	103	80	120	0.928	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190913B**

Sample ID **ICV-190913B**	Batch ID: **R106381**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 2:08:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.0987	0.00500	0.100	0	98.7	90	110			
Barium	0.0997	0.0100	0.100	0	99.7	90	110			
Calcium	2.63	0.300	2.50	0	105	90	110			
Cobalt	0.0963	0.00500	0.100	0	96.3	90	110			
Lithium	0.0988	0.0100	0.100	0	98.8	90	110			
Molybdenum	0.0946	0.00500	0.100	0	94.6	90	110			

Sample ID **LCVL-190913B**	Batch ID: **R106381**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 2:18:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00498	0.00500	0.00500	0	99.7	70	130			
Barium	0.00529	0.0100	0.00500	0	106	70	130			
Calcium	0.102	0.300	0.100	0	102	70	130			
Cobalt	0.00474	0.00500	0.00500	0	94.7	70	130			
Lithium	0.00986	0.0100	0.0100	0	98.6	70	130			
Molybdenum	0.00505	0.00500	0.00500	0	101	70	130			

Sample ID **CCV4-190913**	Batch ID: **R106381**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 4:27:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.202	0.00500	0.200	0	101	90	110			
Barium	0.199	0.0100	0.200	0	99.3	90	110			
Calcium	5.10	0.300	5.00	0	102	90	110			
Cobalt	0.195	0.00500	0.200	0	97.6	90	110			
Lithium	0.192	0.0100	0.200	0	96.0	90	110			
Molybdenum	0.200	0.00500	0.200	0	99.9	90	110			

Sample ID **LCVL4-190913**	Batch ID: **R106381**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 4:32:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00515	0.00500	0.00500	0	103	70	130			
Barium	0.00509	0.0100	0.00500	0	102	70	130			
Calcium	0.151	0.300	0.100	0	151	70	130			S
Cobalt	0.00500	0.00500	0.00500	0	100	70	130			
Lithium	0.00996	0.0100	0.0100	0	99.6	70	130			
Molybdenum	0.00500	0.00500	0.00500	0	100	70	130			

Qualifiers:

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

CLIENT: Golder
Work Order: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190913B

Sample ID **CCV5-190913**	Batch ID: **R106381**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 5:16:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.202	0.00500	0.200	0	101	90	110			
Barium	0.200	0.0100	0.200	0	99.9	90	110			
Calcium	5.17	0.300	5.00	0	103	90	110			
Cobalt	0.197	0.00500	0.200	0	98.7	90	110			
Lithium	0.197	0.0100	0.200	0	98.6	90	110			
Molybdenum	0.202	0.00500	0.200	0	101	90	110			

Sample ID **LCVL5-190913**	Batch ID: **R106381**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 5:21:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00512	0.00500	0.00500	0	102	70	130			
Barium	0.00506	0.0100	0.00500	0	101	70	130			
Calcium	0.153	0.300	0.100	0	153	70	130			S
Cobalt	0.00496	0.00500	0.00500	0	99.2	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Molybdenum	0.00525	0.00500	0.00500	0	105	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190828A

Sample ID **DCS2-92594**	Batch ID: **92594**	TestNo: **E300**		Units: **mg/L**	
SampType: **DCS2**	Run ID: **IC2_190828A**	Analysis Date: **8/28/2019 2:22:32 PM**		Prep Date: **8/28/2019**	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	0.544	1.00	0.5000	0	109	65	135	0	0	
Fluoride	0.255	0.400	0.2000	0	128	65	135	0	0	
Sulfate	1.72	3.00	1.500	0	115	65	135	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190910A

The QC data in batch 92717 applies to the following samples: 1909049-01B, 1909049-02B, 1909049-03B, 1909049-04B, 1909049-05B, 1909049-06B, 1909049-07B, 1909049-08B

Sample ID	**MB-92717**	Batch ID:	**92717**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_190910A**	Analysis Date:	**9/10/2019 10:03:43 AM**	Prep Date:	**9/10/2019**

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-92717**	Batch ID:	**92717**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_190910A**	Analysis Date:	**9/10/2019 10:19:43 AM**	Prep Date:	**9/10/2019**

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	4.04	0.400	4.000	0	101	90	110			
Sulfate	31.5	3.00	30.00	0	105	90	110			

Sample ID	**LCSD-92717**	Batch ID:	**92717**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_190910A**	Analysis Date:	**9/10/2019 10:35:43 AM**	Prep Date:	**9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.5	1.00	10.00	0	105	90	110	0.791	20	
Fluoride	4.08	0.400	4.000	0	102	90	110	0.927	20	
Sulfate	31.8	3.00	30.00	0	106	90	110	0.825	20	

Sample ID	**1909049-01BMS**	Batch ID:	**92717**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190910A**	Analysis Date:	**9/10/2019 11:46:48 AM**	Prep Date:	**9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	595	10.0	200.0	426.4	84.2	90	110			S
Fluoride	209	4.00	200.0	0	105	90	110			
Sulfate	680	30.0	200.0	477.3	101	90	110			

Sample ID	**1909049-01BMSD**	Batch ID:	**92717**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190910A**	Analysis Date:	**9/10/2019 12:02:48 PM**	Prep Date:	**9/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	593	10.0	200.0	426.4	83.3	90	110	0.294	20	S
Fluoride	207	4.00	200.0	0	103	90	110	1.05	20	
Sulfate	677	30.0	200.0	477.3	99.9	90	110	0.355	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190910A

Sample ID **ICV-190910**	Batch ID: **R106325**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_190910A**	Analysis Date: **9/10/2019 9:31:43 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	26.7	1.00	25.00	0	107	90	110			
Fluoride	10.6	0.400	10.00	0	106	90	110			
Sulfate	81.3	3.00	75.00	0	108	90	110			

Sample ID **CCV1-190910**	Batch ID: **R106325**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190910A**	Analysis Date: **9/10/2019 2:58:48 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	4.14	0.400	4.000	0	103	90	110			
Sulfate	32.3	3.00	30.00	0	108	90	110			

Sample ID **CCV2-190910**	Batch ID: **R106325**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190910A**	Analysis Date: **9/10/2019 5:54:48 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.7	1.00	10.00	0	107	90	110			
Fluoride	4.20	0.400	4.000	0	105	90	110			
Sulfate	32.9	3.00	30.00	0	110	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: 1909049
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: WC_190909C

The QC data in batch 92719 applies to the following samples: 1909049-01B, 1909049-02B, 1909049-03B, 1909049-04B, 1909049-05B, 1909049-06B, 1909049-07B, 1909049-08B

Sample ID	**MB-92719**	Batch ID:	**92719**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_190909C**	Analysis Date:	**9/9/2019 3:45:00 PM**	Prep Date:	**9/9/2019**

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-92719**	Batch ID:	**92719**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_190909C**	Analysis Date:	**9/9/2019 3:45:00 PM**	Prep Date:	**9/9/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	759	10.0	745.6	0	102	90	113			

Sample ID	**1909049-01B-DUP**	Batch ID:	**92719**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190909C**	Analysis Date:	**9/9/2019 3:45:00 PM**	Prep Date:	**9/9/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2050	50.0	0	2085				1.94	5	

Sample ID	**1909049-02B-DUP**	Batch ID:	**92719**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190909C**	Analysis Date:	**9/9/2019 3:45:00 PM**	Prep Date:	**9/9/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	1800	50.0	0	1825				1.38	5	

Qualifiers:

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

CLIENT: Golder
Work Order: 1909049
Project: Luminant-A1 Area Landfill MLSES

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: SW6020A	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Arsenic	0.00200	0.00500
Barium	0.00300	0.0100
Boron	0.0100	0.0300
Calcium	0.100	0.300
Cobalt	0.00300	0.00500
Lithium	0.00500	0.0100
Molybdenum	0.00200	0.00500

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

October 09, 2019

DHL Analytical, Inc.

Sample Delivery Group:	L1138079
Samples Received:	09/11/2019
Project Number:	1909049
Description:	

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

Entire Report Reviewed By:

Tom Mellette
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 Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

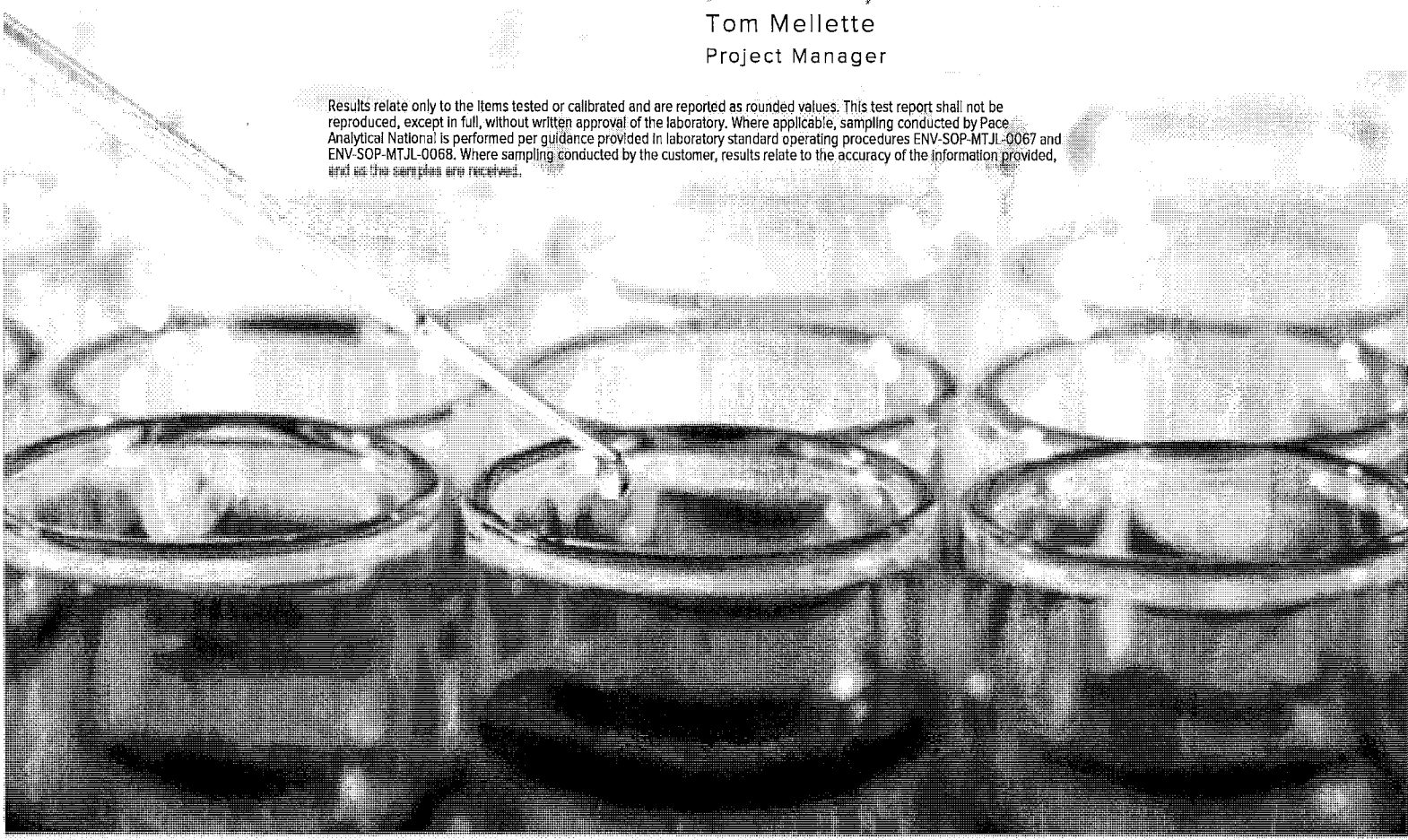


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BMW-21 L1138079-01 Non-Potable Water

Collected by | Collected date/time 09/04/19 08:00 | Received date/time 09/11/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1350897	1	09/24/19 11:29	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1353283	1	10/01/19 10:00	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1353283	1	10/01/19 10:00	10/02/19 08:21	RGT	Mt. Juliet, TN

BMW-20 L1138079-02 Non-Potable Water

Collected by | Collected date/time 09/04/19 08:50 | Received date/time 09/11/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1350897	1	09/24/19 11:29	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1353283	1	10/01/19 10:00	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1353283	1	10/01/19 10:00	10/02/19 08:21	RGT	Mt. Juliet, TN

BMW-27 L1138079-03 Non-Potable Water

Collected by | Collected date/time 09/04/19 09:40 | Received date/time 09/11/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1350897	1	09/24/19 11:30	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1353283	1	10/01/19 10:00	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1353283	1	10/01/19 10:00	10/02/19 08:21	RGT	Mt. Juliet, TN

BMW-26 L1138079-04 Non-Potable Water

Collected by | Collected date/time 09/04/19 10:30 | Received date/time 09/11/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1350897	1	09/24/19 11:30	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1353283	1	10/01/19 10:00	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1353283	1	10/01/19 10:00	10/02/19 08:21	RGT	Mt. Juliet, TN

BMW-11AR L1138079-05 Non-Potable Water

Collected by | Collected date/time 09/04/19 11:30 | Received date/time 09/11/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1350897	1	09/24/19 11:30	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1353283	1	10/01/19 10:00	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1353283	1	10/01/19 10:00	10/02/19 08:21	RGT	Mt. Juliet, TN

BMW-19 L1138079-06 Non-Potable Water

Collected by | Collected date/time 09/04/19 12:20 | Received date/time 09/11/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1350897	1	09/24/19 11:30	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1353283	1	10/01/19 10:00	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1353283	1	10/01/19 10:00	10/02/19 08:21	RGT	Mt. Juliet, TN

BMW-18 L1138079-07 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				09/04/19 13:20	09/11/19 08:45	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1350897	1	09/24/19 11:30	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1353283	1	09/27/19 10:22	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1353283	1	09/27/19 10:22	09/30/19 13:01	RGT	Mt. Juliet, TN

BMW-28 L1138079-08 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				09/04/19 14:20	09/11/19 08:45	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1350897	1	09/24/19 11:30	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1353283	1	09/27/19 10:22	10/04/19 09:20	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1353283	1	09/27/19 10:22	09/30/19 13:01	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.

Tom Mellette
Project Manager

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	1.51		0.445	0.783	10/04/2019 09:20	WG1350897
(T) Barium	*90.6*			*62.0-143*	*10/04/2019 09:20*	WG1350897
(T) Yttrium	*113*			*79.0-136*	*10/04/2019 09:20*	WG1350897

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	2.01		0.746	1.07	10/04/2019 09:20	WG1353283

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	0.506		0.301	0.285	10/02/2019 08:21	WG1353283
(T) Barium-133	*97.8*			*30.0-143*	*10/02/2019 08:21*	WG1353283

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	1.62		0.444	0.661	10/04/2019 09:20	WG1350897
(T) Barium	*98.7*			*62.0-143*	*10/04/2019 09:20*	WG1350897
(T) Yttrium	*104*			*79.0-136*	*10/04/2019 09:20*	WG1350897

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	1.72		0.590	0.88	10/04/2019 09:20	WG1353283

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.0996		0.146	0.219	10/02/2019 08:21	WG1353283
(T) Barium-133	*95.6*			*30.0-143*	*10/02/2019 08:21*	WG1353283

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	1.68		0.484	0.74	10/04/2019 09:20	WG1350897
(T) Barium	*113*			*62.0-143*	*10/04/2019 09:20*	WG1350897
(T) Yttrium	*119*			*79.0-136*	*10/04/2019 09:20*	WG1350897

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	1.75		0.626	0.98	10/04/2019 09:20	WG1353283

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.0726		0.142	0.24	10/02/2019 08:21	WG1353283
(T) Barium-133	*103*			*30.0-143*	*10/02/2019 08:21*	WG1353283

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

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	1.53		0.405	0.641	10/04/2019 09:20	WG1350897
(T) Barium	*108*			*62.0-143*	*10/04/2019 09:20*	WG1350897
(T) Yttrium	*106*			*79.0-136*	*10/04/2019 09:20*	WG1350897

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	1.66		0.591	0.918	10/04/2019 09:20	WG1353283

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	0.126		0.186	0.277	10/02/2019 08:21	WG1353283
(T) Barium-133	*108*			*30.0-143*	*10/02/2019 08:21*	WG1353283

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

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	0.317		0.486	0.817	10/04/2019 09:20	WG1350897
(T) Barium	*87.6*			*62.0-143*	*10/04/2019 09:20*	WG1350897
(T) Yttrium	*106*			*79.0-136*	*10/04/2019 09:20*	WG1350897

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	0.699		0.750	1.1	10/04/2019 09:20	WG1353283

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	0.382		0.264	0.281	10/02/2019 08:21	WG1353283
(T) Barium-133	*105*			*30.0-143*	*10/02/2019 08:21*	WG1353283

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

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	0.563		0.418	0.604	10/04/2019 09:20	WG1350897
(T) Barium	*106*			*62.0-143*	*10/04/2019 09:20*	WG1350897
(T) Yttrium	*106*			*79.0-136*	*10/04/2019 09:20*	WG1350897

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	0.563		0.530	0.871	10/04/2019 09:20	WG1353283

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	-0.00769		0.112	0.267	10/02/2019 08:21	WG1353283
(T) Barium-133	*110*			*30.0-143*	*10/02/2019 08:21*	WG1353283

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

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	1.48		0.412	0.681	10/04/2019 09:20	WG1350897
(T) Barium	*91.4*			*62.0-143*	*10/04/2019 09:20*	WG1350897
(T) Yttrium	*106*			*79.0-136*	*10/04/2019 09:20*	WG1350897

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	1.79		0.631	0.861	10/04/2019 09:20	WG1353283

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	0.304		0.219	0.18	09/30/2019 13:01	WG1353283
(T) Barium-133	*81.4*			*30.0-143*	*09/30/2019 13:01*	WG1353283

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

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	3.20		0.493	0.699	10/04/2019 09:20	WG1350897
(T) Barium	*114*			*62.0-143*	*10/04/2019 09:20*	WG1350897
(T) Yttrium	*113*			*79.0-136*	*10/04/2019 09:20*	WG1350897

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	3.21		0.720	1.24	10/04/2019 09:20	WG1353283

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	0.0173		0.227	0.537	09/30/2019 13:01	WG1353283
(T) Barium-133	*39.0*			*30.0-143*	*09/30/2019 13:01*	WG1353283

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

Method Blank (MB)

(MB) R3459265-1 10/04/19 09:20

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-228	0.617		0.417
(T) Barium	*109*		
(T) Yttrium	*109*		

Laboratory Control Sample (LCS)

(LCS) R3459265-2 10/04/19 09:20

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	5.52	110	80.0-120	
(T) Barium			*104*		
(T) Yttrium			*112*		

Method Blank (MB)

(MB) R3457442-1 09/30/19 13:01

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-226	-0.0206		0.0781
(T) Barium-133	*88.6*		

L1138079-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1138079-02 10/02/19 08:21 • (DUP) R3457442-5 10/02/19 08:21

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.0996	0.134	1	29.6	0.159		20	3
(T) Barium-133	*95.6*	*102*						

Laboratory Control Sample (LCS)

(LCS) R3457442-2 09/30/19 13:01

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.02	4.79	95.3	80.0-120	
(T) Barium-133			*89.6*		

L1138079-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1138079-07 09/30/19 13:01 • (MS) R3457442-3 09/30/19 13:01 • (MSD) R3457442-4 09/30/19 13:01

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	0.304	18.7	18.3	91.4	89.3	1	75.0-125			2.33		20
(T) Barium-133		*81.4*			*84.7*	*79.6*							

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	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.



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

CHAIN-OF-CUSTODY RECORD

Work Order: 1902949

H079

1138019

06-Sep-19

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

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

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Ra 228 E904.0	Ra 226 M7500 Ra B M	Requested Tests			
BMW-21	Aqueous	-01C	09/04/19 08:00 AM	1LHDPEHNO3	1					-01
BMW-21	Aqueous	-01D	09/04/19 08:00 AM	1LHDPEHNO3		1				
BMW-20	Aqueous	-02C	09/04/19 08:50 AM	1LHDPEHNO3	1					02
BMW-20	Aqueous	-02D	09/04/19 08:50 AM	1LHDPEHNO3		1				
BMW-27	Aqueous	-03C	09/04/19 09:40 AM	1LHDPEHNO3	1					03
BMW-27	Aqueous	-03D	09/04/19 09:40 AM	1LHDPEHNO3		1				
BMW-26	Aqueous	-04C	09/04/19 10:30 AM	1LHDPEHNO3	1					04
BMW-26	Aqueous	-04D	09/04/19 10:30 AM	1LHDPEHNO3		1				
BMW-11AR	Aqueous	-05C	09/04/19 11:30 AM	1LHDPEHNO3	1					05
BMW-11AR	Aqueous	-05D	09/04/19 11:30 AM	1LHDPEHNO3		1				
BMW-19	Aqueous	-06C	09/04/19 12:20 PM	1LHDPEHNO3	1					06
BMW-19	Aqueous	-06D	09/04/19 12:20 PM	1LHDPEHNO3		1				
BMW-18	Aqueous	-07C	09/04/19 01:20 PM	1LHDPEHNO3	1					07
BMW-18	Aqueous	-07D	09/04/19 01:20 PM	1LHDPEHNO3		1				
BMW-28	Aqueous	-08C	09/04/19 02:20 PM	1LHDPEHNO3	1					08
BMW-28	Aqueous	-08D	09/04/19 02:20 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

		Date/Time		Date/Time
Relinquished by:		9/9/19 17:00	Received by:	9-11-19 10:00
Relinquished by:			Received by:	

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: DHLRRTX	1138019	
Cooler Received/Opened On: 9/11/19 Temperature:	4.2	
Received By: Lexxi Romero		
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?		/	

October 14, 2019

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

Order No.: 1909083

RE: Luminant-A1 Area Landfill MLSES

Dear Will Vienne:

DHL Analytical, Inc. received 10 sample(s) on 9/11/2019 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

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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*

№ 85534

CHAIN-OF-CUSTODY

CLIENT: GOLDER
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: 9-10-19 PAGE 1 OF 1
PO #: 1912262-D DHL WORK ORDER #: 1909084 (EL 9/11/19)
PROJECT LOCATION OR NAME:
CLENT PROJECT #: 1912262-D 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

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 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 ❑ | TRENDIX III & IV | LITHIUM | COBALT | BARIUM | FIELD NOTES

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ❑ NaOH ❑	ICE	UNPRESERVED	ANALYSES	FIELD NOTES
BMW-24	01	9-9-19	0945	W	P	4		X		X	X		
BMW-23	02		0840	W	P	4		X		X	X		
BMW-22	03		0930	W	P	4		X		X	X		
BMW-29	04		1025	W	P	1		X		X			
BMW-25	05		1140	W	P	1		X		X			
BMW-32	06		1250	W	P	1		X		X			
BMW-33	07		1405	W	P	4		X		X	X		
DUP-01	08		1405	W	P	4		X		X	X		
A1-2-DB	09		1505	W	P	1		X		X			
BMW-30	10	↓	1615	W	P	1		X		X			

RELINQUISHED BY: (Signature) DATE/TIME 9-10-19 1730 RECEIVED BY: (Signature) Fed Ex
RELINQUISHED BY: (Signature) Fed Ex DATE/TIME 9/11/19 0920 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: 2.1, 3.4 °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

Eric Lau

From: Vienne, Will <William_Vienne@golder.com>
Sent: Tuesday, September 10, 2019 2:25 PM
To: Eric Lau
Cc: John DuPont
Subject: RE: Luminant CCR Bottle Order

Follow Up Flag: Follow up
Flag Status: Completed

Eric and John,

We don't have to analyze for all of the Appendix IV parameters during the current sampling period for the sites listed below. Here is a list of the analytes that **shouldn't** be reported for each site:

- Martin Lake A1 Area Landfill: Sb, Be, Cd, Cr, Pb, Hg, Se, and Tl

Sorry for extra work caused by this update. Let me know if you have questions.

William Vienne
Senior Hydrogeologist

Golder Associates Inc.
2201 Double Creek Dr, Suite 4004, Round Rock, Texas, USA 78664
T: +1 512 671-3434 | **C:** +1 512 466-9074 | **golder.com**
LinkedIn | Facebook | Twitter

Formerly Pastor, Behling & Wheeler, LLC
PBW has joined Golder, a leading global engineering and consulting firm. Both companies have a strong reputation for developing practical solutions to complex challenges. Our combined resources allow us to offer greater expertise to our clients globally.

Work Safe, Home Safe

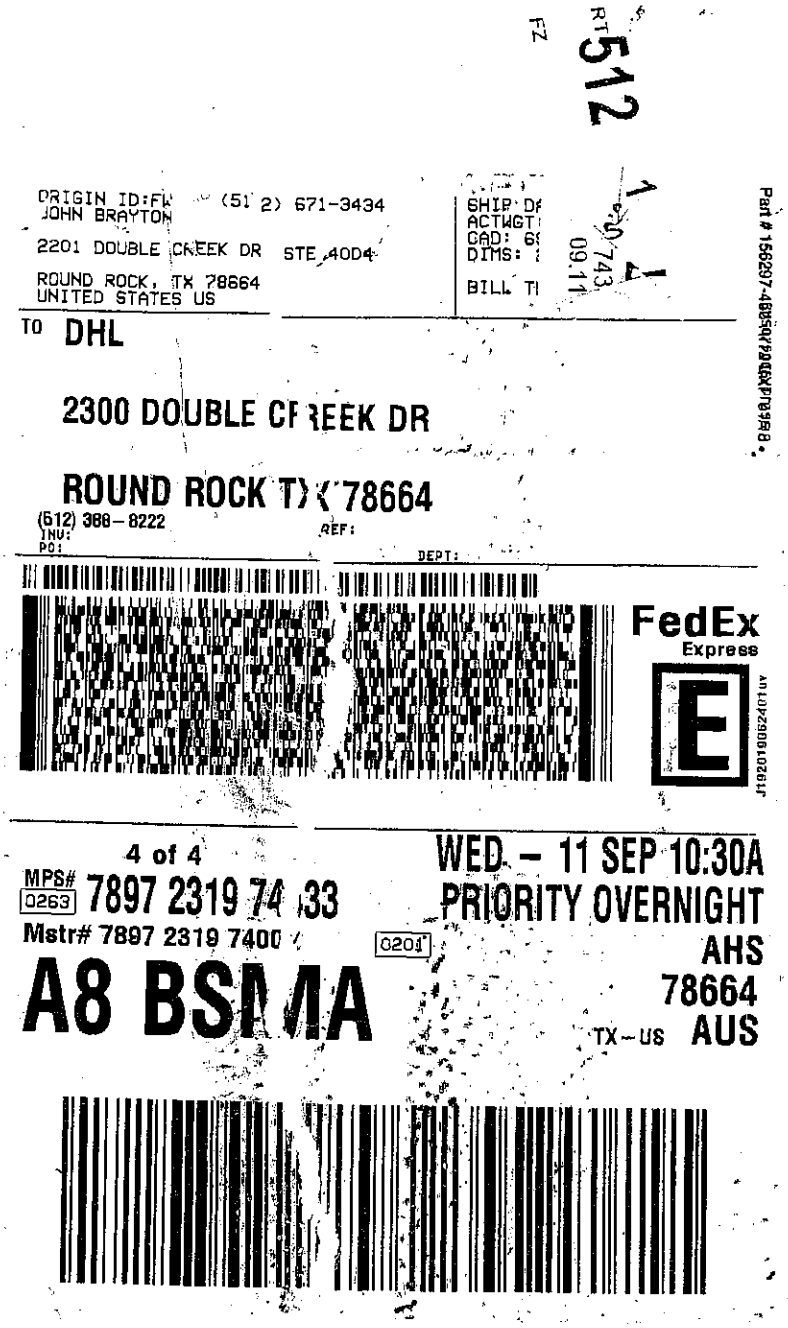
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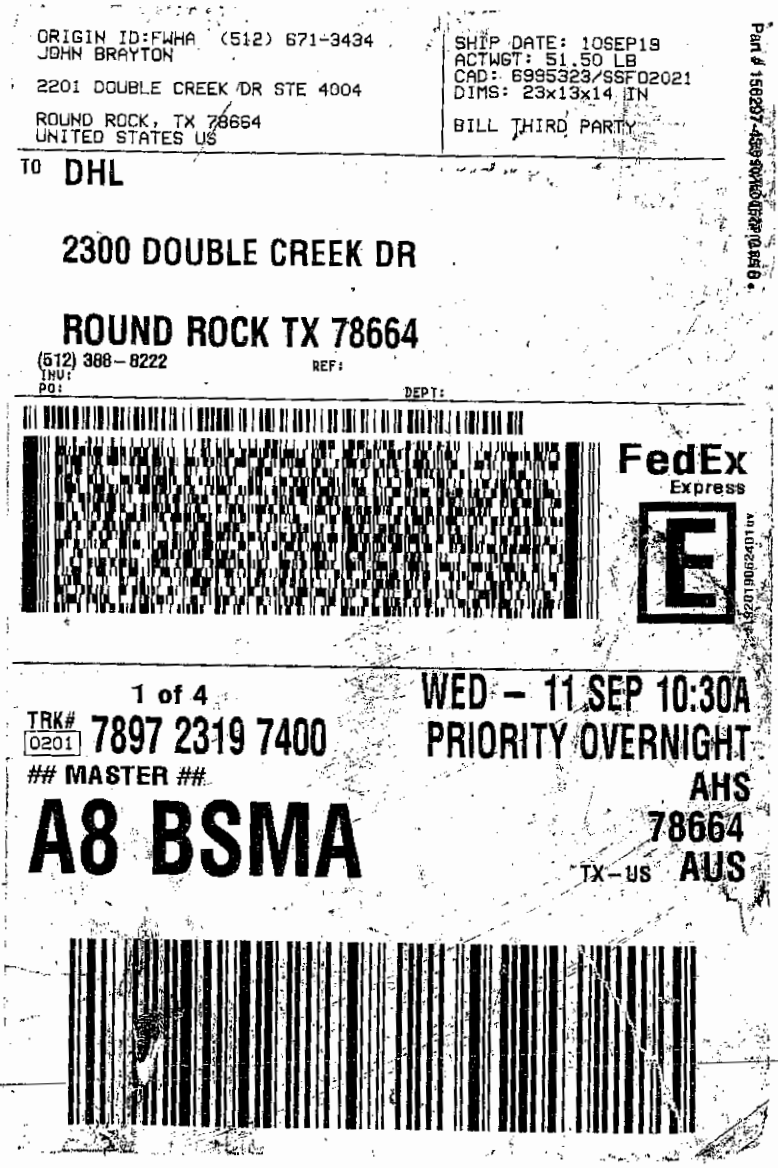
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Please consider the environment before printing this email.

From: Eric Lau <login@dhlanalytical.com>
Sent: Wednesday, August 28, 2019 11:10 AM
To: Vienne, Will <William_Vienne@golder.com>
Cc: John DuPont <dupont@dhlanalytical.com>
Subject: RE: Luminant CCR Bottle Order

EXTERNAL EMAIL


FZ
RT 512
ORIGIN ID:FW (512) 671-3434
JOHN BRAYTON
2201 DOUBLE CREEK DR STE 4004
ROUND ROCK, TX 78664
UNITED STATES US
SHIP DA
ACTWGT:
CAD: 6
DIMS:
BILL TI
09 11
Part # 156297-488
TO DHL
2300 DOUBLE CREEK DR
ROUND ROCK TX 78664
(512) 388-8222
INV:
PO:
REF:
DEPT:
FedEx
Express
4 of 4
MPS# 0263 7897 2319 74 33
Mstr# 7897 2319 7400
0201
A8 BSMA
WED - 11 SEP 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS



ORIGIN ID:FWHA (512) 671-3434
JOHN BRAYTON

2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 10SEP18
ACTWGT: 51.50 LB
CAD: 6995323/SSFO2021
DIMS: 23x13x14 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 4

TRK# 0201 7897 2319 7400

MASTER

A8 BSMA

WED - 11 SEP 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Golder | Date Received: 9/11/2019

Work Order Number 1909083 | Received by EL

Checklist completed by: Signature | 9/11/2019 Date | Reviewed by Initials | 9/11/2019 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 ☐	2.1 °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-A1 Area Landfill MLSES	**LRC Date:** 10/14/19
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 1909083
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-A1 Area Landfill MLSES	**LRC Date:** 10/14/19
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 1909083
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**			**S2-02**
		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

10/14/19

Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

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

CLIENT: Golder
Project: Luminant-A1 Area Landfill MLSES
Lab Order: 1909083

CASE NARRATIVE

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

Method SW6020A - Metals 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 9/11/19. A total of 10 samples were received. The samples arrived in good condition and were properly packaged.

Exception Report R7-03

For Metals analysis performed on 9/13/19 the matrix spike and matrix spike duplicate recoveries were out of control limits for Boron and Calcium. 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 S2-02

For Metals analysis performed on 9/13/19 CCV1-190913 and LCVL1-190913 were above control limits for Boron. These are flagged accordingly in the QC summary report. The associated samples were QC samples. No further corrective actions were taken.

Exception Report S9-01

For Metals analysis performed on 9/13/19 the PDS recovery was slightly below control limits for Cobalt and Lithium. These are flagged accordingly in the QC summary report. The serial dilution was within control limits for these analytes. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *14-Oct-19*

CLIENT: Golder
Project: Luminant-A1 Area Landfill MLSES
Lab Order: 1909083

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1909083-01	BMW-24		09/09/19 07:45 AM	9/11/2019
1909083-02	BMW-23		09/09/19 08:40 AM	9/11/2019
1909083-03	BMW-22		09/09/19 09:30 AM	9/11/2019
1909083-04	BMW-29		09/09/19 10:25 AM	9/11/2019
1909083-05	BMW-25		09/09/19 11:40 AM	9/11/2019
1909083-06	BMW-32		09/09/19 12:50 PM	9/11/2019
1909083-07	BMW-33		09/09/19 02:05 PM	9/11/2019
1909083-08	DUP-01		09/09/19 02:05 PM	9/11/2019
1909083-09	A1-2-DB		09/09/19 03:05 PM	9/11/2019
1909083-10	BMW-30		09/09/19 04:15 PM	9/11/2019

Lab Order: 1909083
Client: Golder
Project: Luminant-A1 Area Landfill MLSE

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1909083-01A	BMW-24	09/09/19 07:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
	BMW-24	09/09/19 07:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
	BMW-24	09/09/19 07:45 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
1909083-01B	BMW-24	09/09/19 07:45 AM	Aqueous	E300	Anion Preparation	09/12/19 09:15 AM	92760
	BMW-24	09/09/19 07:45 AM	Aqueous	E300	Anion Preparation	09/12/19 09:15 AM	92760
	BMW-24	09/09/19 07:45 AM	Aqueous	E300	Anion Preparation	09/12/19 09:15 AM	92760
	BMW-24	09/09/19 07:45 AM	Aqueous	M2540C	TDS Preparation	09/12/19 09:03 AM	92759
1909083-02A	BMW-23	09/09/19 08:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
	BMW-23	09/09/19 08:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
1909083-02B	BMW-23	09/09/19 08:40 AM	Aqueous	E300	Anion Preparation	09/12/19 09:15 AM	92760
	BMW-23	09/09/19 08:40 AM	Aqueous	E300	Anion Preparation	09/12/19 09:15 AM	92760
	BMW-23	09/09/19 08:40 AM	Aqueous	M2540C	TDS Preparation	09/12/19 09:03 AM	92759
1909083-03A	BMW-22	09/09/19 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
	BMW-22	09/09/19 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
1909083-03B	BMW-22	09/09/19 09:30 AM	Aqueous	E300	Anion Preparation	09/12/19 09:15 AM	92760
	BMW-22	09/09/19 09:30 AM	Aqueous	E300	Anion Preparation	09/12/19 09:15 AM	92760
	BMW-22	09/09/19 09:30 AM	Aqueous	M2540C	TDS Preparation	09/12/19 09:03 AM	92759
1909083-04A	BMW-29	09/09/19 10:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
1909083-05A	BMW-25	09/09/19 11:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
1909083-06A	BMW-32	09/09/19 12:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
1909083-07A	BMW-33	09/09/19 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
	BMW-33	09/09/19 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
	BMW-33	09/09/19 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
1909083-07B	BMW-33	09/09/19 02:05 PM	Aqueous	E300	Anion Preparation	09/12/19 09:15 AM	92760
	BMW-33	09/09/19 02:05 PM	Aqueous	E300	Anion Preparation	09/12/19 09:15 AM	92760
	BMW-33	09/09/19 02:05 PM	Aqueous	M2540C	TDS Preparation	09/12/19 09:03 AM	92759
1909083-08A	DUP-01	09/09/19 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
	DUP-01	09/09/19 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756

Lab Order: 1909083
Client: Golder
Project: Luminant-A1 Area Landfill MLSE

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1909083-08A	DUP-01	09/09/19 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
1909083-08B	DUP-01	09/09/19 02:05 PM	Aqueous	E300	Anion Preparation	09/12/19 09:15 AM	92760
	DUP-01	09/09/19 02:05 PM	Aqueous	E300	Anion Preparation	09/12/19 09:15 AM	92760
	DUP-01	09/09/19 02:05 PM	Aqueous	M2540C	TDS Preparation	09/12/19 09:03 AM	92759
1909083-09A	A1-2-DB	09/09/19 03:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756
1909083-10A	BMW-30	09/09/19 04:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	09/12/19 08:43 AM	92756

Lab Order: 1909083
Client: Golder
Project: Luminant-A1 Area Landfill MLSE

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1909083-01A	BMW-24	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/16/19 11:44 AM	ICP-MS4_190916A
	BMW-24	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/13/19 02:25 PM	ICP-MS5_190913B
	BMW-24	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	10	09/16/19 11:42 AM	ICP-MS4_190916A
1909083-01B	BMW-24	Aqueous	E300	Anions by IC method - Water	92760	10	09/12/19 03:21 PM	IC2_190912A
	BMW-24	Aqueous	E300	Anions by IC method - Water	92760	100	09/12/19 05:29 PM	IC2_190912A
	BMW-24	Aqueous	E300	Anions by IC method - Water	92760	1	09/12/19 10:49 PM	IC2_190912A
	BMW-24	Aqueous	M2540C	Total Dissolved Solids	92759	1	09/12/19 04:30 PM	WC_190912B
1909083-02A	BMW-23	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	10	09/16/19 11:46 AM	ICP-MS4_190916A
	BMW-23	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/13/19 02:29 PM	ICP-MS5_190913B
1909083-02B	BMW-23	Aqueous	E300	Anions by IC method - Water	92760	1	09/12/19 11:05 PM	IC2_190912A
	BMW-23	Aqueous	E300	Anions by IC method - Water	92760	10	09/12/19 03:37 PM	IC2_190912A
	BMW-23	Aqueous	M2540C	Total Dissolved Solids	92759	1	09/12/19 04:30 PM	WC_190912B
1909083-03A	BMW-22	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	20	09/16/19 11:48 AM	ICP-MS4_190916A
	BMW-22	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/13/19 02:34 PM	ICP-MS5_190913B
1909083-03B	BMW-22	Aqueous	E300	Anions by IC method - Water	92760	10	09/12/19 03:53 PM	IC2_190912A
	BMW-22	Aqueous	E300	Anions by IC method - Water	92760	1	09/12/19 11:21 PM	IC2_190912A
	BMW-22	Aqueous	M2540C	Total Dissolved Solids	92759	1	09/12/19 04:30 PM	WC_190912B
1909083-04A	BMW-29	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/13/19 02:38 PM	ICP-MS5_190913B
1909083-05A	BMW-25	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/13/19 02:43 PM	ICP-MS5_190913B
1909083-06A	BMW-32	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/13/19 02:47 PM	ICP-MS5_190913B
1909083-07A	BMW-33	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	10	09/16/19 11:50 AM	ICP-MS4_190916A
	BMW-33	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/16/19 11:52 AM	ICP-MS4_190916A
	BMW-33	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/13/19 02:51 PM	ICP-MS5_190913B
1909083-07B	BMW-33	Aqueous	E300	Anions by IC method - Water	92760	1	09/13/19 12:57 AM	IC2_190912A
	BMW-33	Aqueous	E300	Anions by IC method - Water	92760	10	09/12/19 04:09 PM	IC2_190912A
	BMW-33	Aqueous	M2540C	Total Dissolved Solids	92759	1	09/12/19 04:30 PM	WC_190912B
1909083-08A	DUP-01	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/16/19 11:56 AM	ICP-MS4_190916A
	DUP-01	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/13/19 02:56 PM	ICP-MS5_190913B

Lab Order: 1909083
Client: Golder
Project: Luminant-A1 Area Landfill MLSE

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1909083-08A	DUP-01	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	10	09/16/19 11:54 AM	ICP-MS4_190916A
1909083-08B	DUP-01	Aqueous	E300	Anions by IC method - Water	92760	10	09/12/19 04:25 PM	IC2_190912A
	DUP-01	Aqueous	E300	Anions by IC method - Water	92760	1	09/13/19 01:13 AM	IC2_190912A
	DUP-01	Aqueous	M2540C	Total Dissolved Solids	92759	1	09/12/19 04:30 PM	WC_190912B
1909083-09A	A1-2-DB	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/13/19 03:00 PM	ICP-MS5_190913B
1909083-10A	BMW-30	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	92756	1	09/13/19 03:05 PM	ICP-MS5_190913B

DHL Analytical, Inc.

Date: *14-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-24
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909083-01
Project No:	19122262-D	**Collection Date:**	09/09/19 07:45 AM
Lab Order:	1909083	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 02:25 PM
Barium	1.48	0.00300	0.0100		mg/L	1	09/13/19 02:25 PM
Boron	0.247	0.0100	0.0300		mg/L	1	09/16/19 11:44 AM
Calcium	56.4	1.00	3.00		mg/L	10	09/16/19 11:42 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	09/13/19 02:25 PM
Lithium	0.00826	0.00500	0.0100	J	mg/L	1	09/13/19 02:25 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 02:25 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	501	30.0	100		mg/L	100	09/12/19 05:29 PM
Fluoride	0.534	0.100	0.400		mg/L	1	09/12/19 10:49 PM
Sulfate	16.4	1.00	3.00		mg/L	1	09/12/19 10:49 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	985	50.0	50.0		mg/L	1	09/12/19 04:30 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: *14-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-23
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909083-02
Project No:	19122262-D	**Collection Date:**	09/09/19 08:40 AM
Lab Order:	1909083	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 02:29 PM
Barium	0.0382	0.00300	0.0100		mg/L	1	09/13/19 02:29 PM
Boron	1.47	0.100	0.300		mg/L	10	09/16/19 11:46 AM
Calcium	98.9	1.00	3.00		mg/L	10	09/16/19 11:46 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	09/13/19 02:29 PM
Lithium	0.0896	0.00500	0.0100		mg/L	1	09/13/19 02:29 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 02:29 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	257	3.00	10.0		mg/L	10	09/12/19 03:37 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	09/12/19 11:05 PM
Sulfate	503	10.0	30.0		mg/L	10	09/12/19 03:37 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1680	50.0	50.0		mg/L	1	09/12/19 04:30 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: *14-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-22
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909083-03
Project No:	19122262-D	**Collection Date:**	09/09/19 09:30 AM
Lab Order:	1909083	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 02:34 PM
Barium	0.0599	0.00300	0.0100		mg/L	1	09/13/19 02:34 PM
Boron	3.65	0.200	0.600		mg/L	20	09/16/19 11:48 AM
Calcium	208	2.00	6.00		mg/L	20	09/16/19 11:48 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	09/13/19 02:34 PM
Lithium	0.0829	0.00500	0.0100		mg/L	1	09/13/19 02:34 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 02:34 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	307	3.00	10.0		mg/L	10	09/12/19 03:53 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	09/12/19 11:21 PM
Sulfate	960	10.0	30.0		mg/L	10	09/12/19 03:53 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2420	50.0	50.0		mg/L	1	09/12/19 04:30 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: *14-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-29
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909083-04
Project No:	19122262-D	**Collection Date:**	09/09/19 10:25 AM
Lab Order:	1909083	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Lithium	0.107	0.00500	0.0100		mg/L	1	09/13/19 02:38 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: *14-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-25
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909083-05
Project No:	19122262-D	**Collection Date:**	09/09/19 11:40 AM
Lab Order:	1909083	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Cobalt	0.00717	0.00300	0.00500		mg/L	1	09/13/19 02:43 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: *14-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-32
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909083-06
Project No:	19122262-D	**Collection Date:**	09/09/19 12:50 PM
Lab Order:	1909083	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Cobalt	0.00690	0.00300	0.00500		mg/L	1	09/13/19 02:47 PM
Lithium	0.115	0.00500	0.0100		mg/L	1	09/13/19 02:47 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: *14-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-33
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909083-07
Project No:	19122262-D	**Collection Date:**	09/09/19 02:05 PM
Lab Order:	1909083	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 02:51 PM
Barium	0.285	0.00300	0.0100		mg/L	1	09/13/19 02:51 PM
Boron	0.269	0.0100	0.0300		mg/L	1	09/16/19 11:52 AM
Calcium	95.8	1.00	3.00		mg/L	10	09/16/19 11:50 AM
Cobalt	0.0122	0.00300	0.00500		mg/L	1	09/13/19 02:51 PM
Lithium	0.0177	0.00500	0.0100		mg/L	1	09/13/19 02:51 PM
Molybdenum	0.00325	0.00200	0.00500	J	mg/L	1	09/13/19 02:51 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	79.5	3.00	10.0		mg/L	10	09/12/19 04:09 PM
Fluoride	0.145	0.100	0.400	J	mg/L	1	09/13/19 12:57 AM
Sulfate	232	10.0	30.0		mg/L	10	09/12/19 04:09 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1040	50.0	50.0		mg/L	1	09/12/19 04:30 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: *14-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	DUP-01
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909083-08
Project No:	19122262-D	**Collection Date:**	09/09/19 02:05 PM
Lab Order:	1909083	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	09/13/19 02:56 PM
Barium	0.282	0.00300	0.0100		mg/L	1	09/13/19 02:56 PM
Boron	0.261	0.0100	0.0300		mg/L	1	09/16/19 11:56 AM
Calcium	97.2	1.00	3.00		mg/L	10	09/16/19 11:54 AM
Cobalt	0.0116	0.00300	0.00500		mg/L	1	09/13/19 02:56 PM
Lithium	0.0173	0.00500	0.0100		mg/L	1	09/13/19 02:56 PM
Molybdenum	0.00330	0.00200	0.00500	J	mg/L	1	09/13/19 02:56 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	80.2	3.00	10.0		mg/L	10	09/12/19 04:25 PM
Fluoride	0.147	0.100	0.400	J	mg/L	1	09/13/19 01:13 AM
Sulfate	231	10.0	30.0		mg/L	10	09/12/19 04:25 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1070	50.0	50.0		mg/L	1	09/12/19 04:30 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
- 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

See Final Page of Report for MQLs and MDLs

DHL Analytical, Inc.

Date: *14-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	A1-2-DB
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909083-09
Project No:	19122262-D	**Collection Date:**	09/09/19 03:05 PM
Lab Order:	1909083	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	09/13/19 03:00 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	09/13/19 03:00 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: *14-Oct-19*

CLIENT:	Golder	**Client Sample ID:**	BMW-30
Project:	Luminant-A1 Area Landfill MLSES	**Lab ID:**	1909083-10
Project No:	19122262-D	**Collection Date:**	09/09/19 04:15 PM
Lab Order:	1909083	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Barium	0.0636	0.00300	0.0100		mg/L	1	09/13/19 03:05 PM
Lithium	0.0539	0.00500	0.0100		mg/L	1	09/13/19 03:05 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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190621B

Sample ID	**DCS2-91398**	Batch ID:	**91398**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**DCS2**	Run ID:	**ICP-MS4_190621B**	Analysis Date:	**6/21/2019 1:24:00 PM**	Prep Date:	**6/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.321	0.300	0.300	0	107	70	130	0	0	

Sample ID	**DCS4-91398**	Batch ID:	**91398**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**DCS4**	Run ID:	**ICP-MS4_190621B**	Analysis Date:	**6/21/2019 1:30:00 PM**	Prep Date:	**6/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0311	0.0300	0.0300	0	104	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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190916A

The QC data in batch 92756 applies to the following samples: 1909083-01A, 1909083-02A, 1909083-03A, 1909083-04A, 1909083-05A, 1909083-06A, 1909083-07A, 1909083-08A, 1909083-09A, 1909083-10A

Sample ID **1909082-01A SD** Batch ID: **92756** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_190916A** Analysis Date: **9/16/2019 11:02:00 AM** Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	21.6	15.0	0	19.7				9.03	10	
Calcium	247	150	0	234				5.51	10	

Sample ID **1909082-01A PDS** Batch ID: **92756** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_190916A** Analysis Date: **9/16/2019 11:24:00 AM** Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	39.6	3.00	20.0	19.7	99.5	80	120			
Calcium	717	30.0	500	234	96.7	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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190916A

Sample ID **ICV-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 10:41:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.107	0.0300	0.100	0	107	90	110			
Calcium	2.60	0.300	2.50	0	104	90	110			

Sample ID **LCVL-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 10:53:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0203	0.0300	0.0200	0	101	70	130			
Calcium	0.101	0.300	0.100	0	101	70	130			

Sample ID **CCV1-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 11:26:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.212	0.0300	0.200	0	106	90	110			
Calcium	4.88	0.300	5.00	0	97.5	90	110			

Sample ID **LCVL1-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 11:32:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0243	0.0300	0.0200	0	121	70	130			
Calcium	0.104	0.300	0.100	0	104	70	130			

Sample ID **CCV2-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 11:58:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.205	0.0300	0.200	0	103	90	110			
Calcium	4.96	0.300	5.00	0	99.2	90	110			

Sample ID **LCVL2-190916**	Batch ID: **R106389**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190916A**	Analysis Date: **9/16/2019 12:05:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0229	0.0300	0.0200	0	114	70	130			
Calcium	0.112	0.300	0.100	0	112	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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190621A

Sample ID **DCS2-91398**	Batch ID: **91398**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **DCS2**	Run ID: **ICP-MS5_190621A**	Analysis Date: **6/21/2019 11:14:00 AM**	Prep Date: **6/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.305	0.300	0.300	0	102	70	130	0	0	

Sample ID **DCS3-91398**	Batch ID: **91398**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **DCS3**	Run ID: **ICP-MS5_190621A**	Analysis Date: **6/21/2019 11:16:00 AM**	Prep Date: **6/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00512	0.00500	0.00500	0	102	70	130	0	0	
Barium	0.00506	0.0100	0.00500	0	101	70	130	0	0	
Cobalt	0.00516	0.00500	0.00500	0	103	70	130	0	0	
Lithium	0.00535	0.0100	0.00500	0	107	70	130	0	0	
Molybdenum	0.00526	0.00500	0.00500	0	105	70	130	0	0	

Sample ID **DCS4-91398**	Batch ID: **91398**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **DCS4**	Run ID: **ICP-MS5_190621A**	Analysis Date: **6/21/2019 11:19:00 AM**	Prep Date: **6/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0344	0.0300	0.0300	0	115	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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190913A**

The QC data in batch 92756 applies to the following samples: 1909083-01A, 1909083-02A, 1909083-03A, 1909083-04A, 1909083-05A, 1909083-06A, 1909083-07A, 1909083-08A, 1909083-09A, 1909083-10A

Sample ID **MB-92756** Batch ID: **92756** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_190913A** Analysis Date: **9/13/2019 10:57:00 AM** Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Boron	<0.0100	0.0300								
Calcium	<0.100	0.300								
Cobalt	<0.00300	0.00500								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								

Sample ID **LCS-92756** Batch ID: **92756** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_190913A** Analysis Date: **9/13/2019 10:59:00 AM** Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.205	0.00500	0.200	0	102	80	120			
Barium	0.203	0.0100	0.200	0	102	80	120			
Boron	0.197	0.0300	0.200	0	98.5	80	120			
Calcium	4.91	0.300	5.00	0	98.2	80	120			
Cobalt	0.199	0.00500	0.200	0	99.5	80	120			
Lithium	0.207	0.0100	0.200	0	103	80	120			
Molybdenum	0.202	0.00500	0.200	0	101	80	120			

Sample ID **LCSD-92756** Batch ID: **92756** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_190913A** Analysis Date: **9/13/2019 11:01:00 AM** Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.204	0.00500	0.200	0	102	80	120	0.307	15	
Barium	0.201	0.0100	0.200	0	101	80	120	0.787	15	
Boron	0.216	0.0300	0.200	0	108	80	120	9.37	15	
Calcium	5.07	0.300	5.00	0	101	80	120	3.19	15	
Cobalt	0.199	0.00500	0.200	0	99.3	80	120	0.260	15	
Lithium	0.203	0.0100	0.200	0	102	80	120	1.76	15	
Molybdenum	0.200	0.00500	0.200	0	100	80	120	0.874	15	

Sample ID **1909082-01A SD** Batch ID: **92756** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_190913A** Analysis Date: **9/13/2019 11:19:00 AM** Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	<0.0100	0.0250	0	0.00845				0	10	
Barium	0.0150	0.0500	0	0.0158				4.67	10	
Cobalt	0.418	0.0250	0	0.410				1.91	10	

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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190913A

Sample ID **1909082-01A SD**	Batch ID: **92756**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS5_190913A**	Analysis Date: **9/13/2019 11:19:00 AM**	Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.226	0.0500	0	0.225				0.494	10	
Molybdenum	<0.0100	0.0250	0	0				0	10	

Sample ID **1909082-01A PDS**	Batch ID: **92756**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS5_190913A**	Analysis Date: **9/13/2019 12:01:00 PM**	Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.195	0.00500	0.200	0.00845	93.3	80	120			
Barium	0.209	0.0100	0.200	0.0158	96.8	80	120			
Cobalt	0.556	0.00500	0.200	0.410	73.0	80	120			S
Lithium	0.383	0.0100	0.200	0.225	79.0	80	120			S
Molybdenum	0.192	0.00500	0.200	0	95.9	80	120			

Sample ID **1909082-01A MS**	Batch ID: **92756**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_190913A**	Analysis Date: **9/13/2019 12:12:00 PM**	Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.202	0.00500	0.200	0.00845	96.6	80	120			
Barium	0.218	0.0100	0.200	0.0158	101	80	120			
Boron	19.1	0.0300	0.200	18.5	310	80	120			S
Calcium	255	0.300	5.00	244	219	80	120			S
Cobalt	0.586	0.00500	0.200	0.410	88.2	80	120			
Lithium	0.400	0.0100	0.200	0.225	87.3	80	120			
Molybdenum	0.202	0.00500	0.200	0	101	80	120			

Sample ID **1909082-01A MSD**	Batch ID: **92756**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_190913A**	Analysis Date: **9/13/2019 12:23:00 PM**	Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.202	0.00500	0.200	0.00845	96.6	80	120	0.055	15	
Barium	0.215	0.0100	0.200	0.0158	99.8	80	120	1.05	15	
Boron	18.1	0.0300	0.200	18.5	-185	80	120	5.31	15	S
Calcium	250	0.300	5.00	244	124	80	120	1.88	15	S
Cobalt	0.580	0.00500	0.200	0.410	84.9	80	120	1.12	15	
Lithium	0.396	0.0100	0.200	0.225	85.2	80	120	1.04	15	
Molybdenum	0.201	0.00500	0.200	0	100	80	120	0.867	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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190913A

Sample ID	ICV-190913	Batch ID:	R106370	TestNo:	SW6020A	Units:	mg/L
SampType:	ICV	Run ID:	ICP-MS5_190913A	Analysis Date:	9/13/2019 10:43:00 AM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.0988	0.00500	0.100	0	98.8	90	110			
Barium	0.0979	0.0100	0.100	0	97.9	90	110			
Boron	0.0982	0.0300	0.100	0	98.2	90	110			
Calcium	2.64	0.300	2.50	0	106	90	110			
Cobalt	0.0966	0.00500	0.100	0	96.6	90	110			
Lithium	0.100	0.0100	0.100	0	100	90	110			
Molybdenum	0.0968	0.00500	0.100	0	96.8	90	110			

Sample ID	LCVL-190913	Batch ID:	R106370	TestNo:	SW6020A	Units:	mg/L
SampType:	LCVL	Run ID:	ICP-MS5_190913A	Analysis Date:	9/13/2019 10:50:00 AM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00515	0.00500	0.00500	0	103	70	130			
Barium	0.00522	0.0100	0.00500	0	104	70	130			
Boron	0.0234	0.0300	0.0200	0	117	70	130			
Calcium	0.0978	0.300	0.100	0	97.8	70	130			
Cobalt	0.00486	0.00500	0.00500	0	97.3	70	130			
Lithium	0.0100	0.0100	0.0100	0	100	70	130			
Molybdenum	0.00516	0.00500	0.00500	0	103	70	130			

Sample ID	CCV1-190913	Batch ID:	R106370	TestNo:	SW6020A	Units:	mg/L
SampType:	CCV	Run ID:	ICP-MS5_190913A	Analysis Date:	9/13/2019 12:39:00 PM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.199	0.00500	0.200	0	99.6	90	110			
Barium	0.197	0.0100	0.200	0	98.3	90	110			
Boron	0.482	0.0300	0.200	0	241	90	110			S
Calcium	5.11	0.300	5.00	0	102	90	110			
Cobalt	0.194	0.00500	0.200	0	96.8	90	110			
Lithium	0.181	0.0100	0.200	0	90.4	90	110			
Molybdenum	0.202	0.00500	0.200	0	101	90	110			

Sample ID	LCVL1-190913	Batch ID:	R106370	TestNo:	SW6020A	Units:	mg/L
SampType:	LCVL	Run ID:	ICP-MS5_190913A	Analysis Date:	9/13/2019 12:58:00 PM	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00486	0.00500	0.00500	0	97.2	70	130			
Barium	0.00513	0.0100	0.00500	0	103	70	130			
Boron	0.0693	0.0300	0.0200	0	347	70	130			S
Calcium	0.122	0.300	0.100	0	122	70	130			
Cobalt	0.00496	0.00500	0.00500	0	99.3	70	130			

Qualifiers:

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

CLIENT: Golder
Work Order: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190913A

Sample ID **LCVL1-190913** Batch ID: **R106370** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS5_190913A** Analysis Date: **9/13/2019 12:58:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.00909	0.0100	0.0100	0	90.9	70	130			
Molybdenum	0.00521	0.00500	0.00500	0	104	70	130			

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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190913B

Sample ID **ICV-190913B**	Batch ID: **R106381**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 2:08:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.0987	0.00500	0.100	0	98.7	90	110			
Barium	0.0997	0.0100	0.100	0	99.7	90	110			
Cobalt	0.0963	0.00500	0.100	0	96.3	90	110			
Lithium	0.0988	0.0100	0.100	0	98.8	90	110			
Molybdenum	0.0946	0.00500	0.100	0	94.6	90	110			

Sample ID **LCVL-190913B**	Batch ID: **R106381**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 2:18:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00498	0.00500	0.00500	0	99.7	70	130			
Barium	0.00529	0.0100	0.00500	0	106	70	130			
Cobalt	0.00474	0.00500	0.00500	0	94.7	70	130			
Lithium	0.00986	0.0100	0.0100	0	98.6	70	130			
Molybdenum	0.00505	0.00500	0.00500	0	101	70	130			

Sample ID **CCV2-190913**	Batch ID: **R106381**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 3:09:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.200	0.00500	0.200	0	100	90	110			
Barium	0.199	0.0100	0.200	0	99.5	90	110			
Cobalt	0.194	0.00500	0.200	0	97.2	90	110			
Lithium	0.191	0.0100	0.200	0	95.7	90	110			
Molybdenum	0.197	0.00500	0.200	0	98.7	90	110			

Sample ID **LCVL2-190913**	Batch ID: **R106381**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190913B**	Analysis Date: **9/13/2019 3:22:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00476	0.00500	0.00500	0	95.3	70	130			
Barium	0.00488	0.0100	0.00500	0	97.5	70	130			
Cobalt	0.00484	0.00500	0.00500	0	96.9	70	130			
Lithium	0.00976	0.0100	0.0100	0	97.6	70	130			
Molybdenum	0.00499	0.00500	0.00500	0	99.9	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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190828A

Sample ID **DCS2-92594**	Batch ID: **92594**	TestNo: **E300**		Units: **mg/L**	
SampType: **DCS2**	Run ID: **IC2_190828A**	Analysis Date: **8/28/2019 2:22:32 PM**		Prep Date: **8/28/2019**	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	0.544	1.00	0.5000	0	109	65	135	0	0	
Fluoride	0.255	0.400	0.2000	0	128	65	135	0	0	
Sulfate	1.72	3.00	1.500	0	115	65	135	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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190912A

The QC data in batch 92760 applies to the following samples: 1909083-01B, 1909083-02B, 1909083-03B, 1909083-07B, 1909083-08B

Sample ID	**MB-92760**	Batch ID:	**92760**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_190912A**	Analysis Date:	**9/12/2019 10:30:26 AM**	Prep Date:	**9/12/2019**

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-92760**	Batch ID:	**92760**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_190912A**	Analysis Date:	**9/12/2019 10:46:26 AM**	Prep Date:	**9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.5	1.00	10.00	0	105	90	110			
Fluoride	4.13	0.400	4.000	0	103	90	110			
Sulfate	32.1	3.00	30.00	0	107	90	110			

Sample ID	**LCSD-92760**	Batch ID:	**92760**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_190912A**	Analysis Date:	**9/12/2019 11:02:26 AM**	Prep Date:	**9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.7	1.00	10.00	0	107	90	110	1.32	20	
Fluoride	4.16	0.400	4.000	0	104	90	110	0.666	20	
Sulfate	32.4	3.00	30.00	0	108	90	110	0.971	20	

Sample ID	**1909082-01BMS**	Batch ID:	**92760**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190912A**	Analysis Date:	**9/12/2019 6:01:22 PM**	Prep Date:	**9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2380	100	2000	227.4	108	90	110			
Fluoride	2150	40.0	2000	0	107	90	110			
Sulfate	4790	300	2000	2640	107	90	110			

Sample ID	**1909082-01BMSD**	Batch ID:	**92760**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190912A**	Analysis Date:	**9/12/2019 6:17:22 PM**	Prep Date:	**9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2390	100	2000	227.4	108	90	110	0.079	20	
Fluoride	2150	40.0	2000	0	107	90	110	0.148	20	
Sulfate	4800	300	2000	2640	108	90	110	0.337	20	

Sample ID	**1909082-02BMS**	Batch ID:	**92760**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190912A**	Analysis Date:	**9/12/2019 6:49:22 PM**	Prep Date:	**9/12/2019**

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

Qualifiers:

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

CLIENT: Golder
Work Order: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190912A

Sample ID **1909082-02BMS**	Batch ID: **92760**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_190912A**	Analysis Date: **9/12/2019 6:49:22 PM**	Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	339	10.0	200.0	127.5	106	90	110			
Fluoride	214	4.00	200.0	1.098	106	90	110			
Sulfate	582	30.0	200.0	364.7	109	90	110			

Sample ID **1909082-02BMSD**	Batch ID: **92760**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_190912A**	Analysis Date: **9/12/2019 7:05:22 PM**	Prep Date: **9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	341	10.0	200.0	127.5	107	90	110	0.453	20	
Fluoride	215	4.00	200.0	1.098	107	90	110	0.718	20	
Sulfate	585	30.0	200.0	364.7	110	90	110	0.453	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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190912A

Sample ID **ICV-190912**	Batch ID: **R106363**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_190912A**	Analysis Date: **9/12/2019 9:58:26 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	26.9	1.00	25.00	0	108	90	110			
Fluoride	10.6	0.400	10.00	0	106	90	110			
Sulfate	81.9	3.00	75.00	0	109	90	110			

Sample ID **CCV1-190912**	Batch ID: **R106363**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190912A**	Analysis Date: **9/12/2019 2:49:19 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.7	1.00	10.00	0	107	90	110			
Fluoride	4.22	0.400	4.000	0	105	90	110			
Sulfate	32.4	3.00	30.00	0	108	90	110			

Sample ID **CCV2-190912**	Batch ID: **R106363**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190912A**	Analysis Date: **9/12/2019 8:25:22 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.8	1.00	10.00	0	108	90	110			
Fluoride	4.27	0.400	4.000	0	107	90	110			
Sulfate	32.2	3.00	30.00	0	107	90	110			

Sample ID **CCV3-190912**	Batch ID: **R106363**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190912A**	Analysis Date: **9/13/2019 12:25:22 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.31	0.400	4.000	0	108	90	110			
Sulfate	32.5	3.00	30.00	0	108	90	110			

Sample ID **CCV4-190912**	Batch ID: **R106363**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190912A**	Analysis Date: **9/13/2019 2:33:22 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.30	0.400	4.000	0	108	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: 1909083
Project: Luminant-A1 Area Landfill MLSES

ANALYTICAL QC SUMMARY REPORT

RunID: WC_190912B

The QC data in batch 92759 applies to the following samples: 1909083-01B, 1909083-02B, 1909083-03B, 1909083-07B, 1909083-08B

Sample ID	**MB-92759**	Batch ID:	**92759**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_190912B**	Analysis Date:	**9/12/2019 4:30:00 PM**	Prep Date:	**9/12/2019**

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-92759**	Batch ID:	**92759**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_190912B**	Analysis Date:	**9/12/2019 4:30:00 PM**	Prep Date:	**9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	762	10.0	745.6	0	102	90	113			

Sample ID	**1909082-01B-DUP**	Batch ID:	**92759**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190912B**	Analysis Date:	**9/12/2019 4:30:00 PM**	Prep Date:	**9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	4190	50.0	0	4220				0.713	5	

Sample ID	**1909082-04B-DUP**	Batch ID:	**92759**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190912B**	Analysis Date:	**9/12/2019 4:30:00 PM**	Prep Date:	**9/12/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	1560	50.0	0	1600				2.53	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: *14-Oct-19*

CLIENT: Golder
Work Order: 1909083
Project: Luminant-A1 Area Landfill MLSES

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: SW6020A	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Arsenic	0.00200	0.00500
Barium	0.00300	0.0100
Boron	0.0100	0.0300
Calcium	0.100	0.300
Cobalt	0.00300	0.00500
Lithium	0.00500	0.0100
Molybdenum	0.00200	0.00500

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

October 11, 2019

DHL Analytical, Inc.

Sample Delivery Group:	L1140296
Samples Received:	09/17/2019
Project Number:	1909083
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 Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

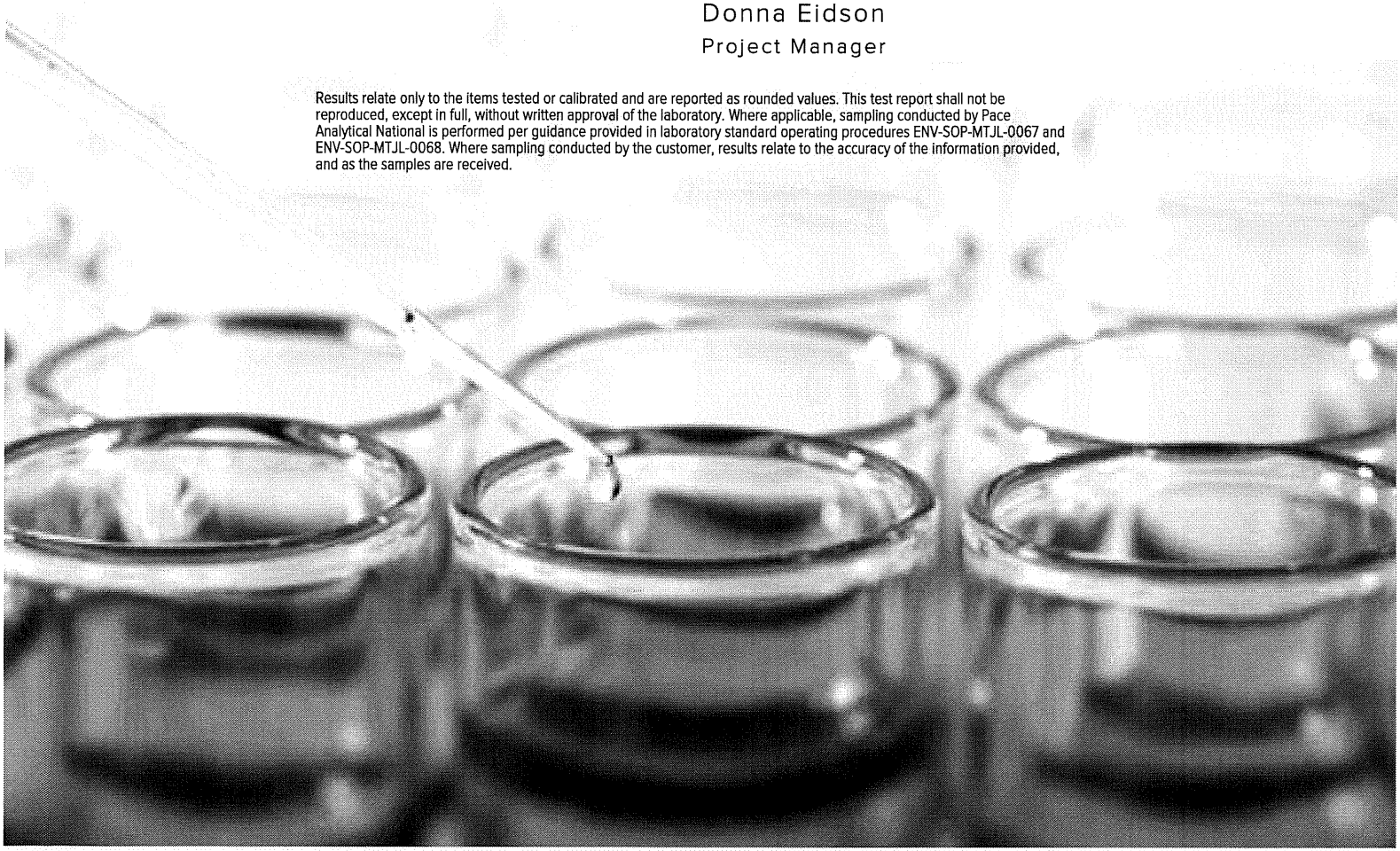


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BMW-24 L1140296-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/09/19 07:45	09/17/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1351650	1	09/25/19 08:47	09/30/19 14:55	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1357396	1	10/04/19 10:50	10/07/19 13:02	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1357396	1	10/04/19 10:50	10/07/19 13:02	RGT	Mt. Juliet, TN

BMW-23 L1140296-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/09/19 08:40	09/17/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1351650	1	09/25/19 08:47	09/30/19 14:55	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1357396	1	10/04/19 10:50	10/07/19 17:26	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1357396	1	10/04/19 10:50	10/07/19 17:26	RGT	Mt. Juliet, TN

BMW-22 L1140296-03 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/09/19 09:30	09/17/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1351650	1	09/25/19 08:47	09/30/19 14:55	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1357396	1	10/04/19 10:50	10/07/19 17:26	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1357396	1	10/04/19 10:50	10/07/19 17:26	RGT	Mt. Juliet, TN

BMW-33 L1140296-04 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/09/19 14:05	09/17/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1351650	1	09/25/19 08:47	09/30/19 14:55	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1357396	1	10/04/19 10:50	10/07/19 17:26	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1357396	1	10/04/19 10:50	10/07/19 17:26	RGT	Mt. Juliet, TN

DUP-01 L1140296-05 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/09/19 14:05	09/17/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1351650	1	09/25/19 08:47	09/30/19 14:55	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1357396	1	10/04/19 10:50	10/07/19 17:26	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1357396	1	10/04/19 10:50	10/07/19 17:26	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	1.41		0.467	0.812	09/30/2019 14:55	WG1351650
(T) Barium	*111*			*62.0-143*	*09/30/2019 14:55*	WG1351650
(T) Yttrium	*104*			*79.0-136*	*09/30/2019 14:55*	WG1351650

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	2.00		0.786	1.11	10/07/2019 13:02	WG1357396

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.584		0.319	0.302	10/07/2019 13:02	WG1357396
(T) Barium-133	*90.7*			*30.0-143*	*10/07/2019 13:02*	WG1357396

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	2.40		0.440	0.73	09/30/2019 14:55	WG1351650
(T) Barium	*88.3*			*62.0-143*	*09/30/2019 14:55*	WG1351650
(T) Yttrium	*113*			*79.0-136*	*09/30/2019 14:55*	WG1351650

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	2.98		0.742	0.949	10/07/2019 17:26	WG1357396

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.583		0.302	0.219	10/07/2019 17:26	WG1357396
(T) Barium-133	*92.9*			*30.0-143*	*10/07/2019 17:26*	WG1357396

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.85		0.438	0.615	09/30/2019 14:55	WG1351650
(T) Barium	*102*			*62.0-143*	*09/30/2019 14:55*	WG1351650
(T) Yttrium	*109*			*79.0-136*	*09/30/2019 14:55*	WG1351650

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	2.81		0.773	0.806	10/07/2019 17:26	WG1357396

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.954		0.335	0.191	10/07/2019 17:26	WG1357396
(T) Barium-133	*98.8*			*30.0-143*	*10/07/2019 17:26*	WG1357396

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	-0.0903		0.483	0.809	09/30/2019 14:55	WG1351650
(T) Barium	*90.8*			*62.0-143*	*09/30/2019 14:55*	WG1351650
(T) Yttrium	*106*			*79.0-136*	*09/30/2019 14:55*	WG1351650

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.738		0.834	1.15	10/07/2019 17:26	WG1357396

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.738		0.351	0.34	10/07/2019 17:26	WG1357396
(T) Barium-133	*87.4*			*30.0-143*	*10/07/2019 17:26*	WG1357396

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

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.545		0.409	0.763	09/30/2019 14:55	WG1351650
(T) Barium	*94.7*			*62.0-143*	*09/30/2019 14:55*	WG1351650
(T) Yttrium	*104*			*79.0-136*	*09/30/2019 14:55*	WG1351650

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.06		0.688	0.972	10/07/2019 17:26	WG1357396

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.519		0.279	0.209	10/07/2019 17:26	WG1357396
(T) Barium-133	*96.1*			*30.0-143*	*10/07/2019 17:26*	WG1357396

Method Blank (MB)

(MB) R3456756-1 09/30/19 10:45

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-228	0.453		0.427
(T) Barium	*110*		
(T) Yttrium	*105*		

L1140736-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1140736-01 09/30/19 14:55 • (DUP) R3456756-5 09/30/19 10:45

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	-0.325	0.203	1	200	0.695		20	3
(T) Barium	*108*	*113*						
(T) Yttrium	*107*	*108*						

Laboratory Control Sample (LCS)

(LCS) R3456756-2 09/30/19 10:45

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	5.83	117	80.0-120	
(T) Barium			*114*		
(T) Yttrium			*104*		

L1140088-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1140088-01 09/30/19 14:55 • (MS) R3456756-3 09/30/19 10:45 • (MSD) R3456756-4 09/30/19 10:45

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	10.0	0.556	10.5	12.4	98.9	118	1	70.0-130			16.8		20
(T) Barium		*91.4*			*103*	*110*							
(T) Yttrium		*107*			*108*	*101*							

Method Blank (MB)

(MB) R3458990-1 10/07/19 12:41

Analyte	MB Result	MB Qualifier	MB MDA
	pCi/l		pCi/l
Radium-226	0.0292		0.0567
(T) Barium-133	*99.8*		

L1138569-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1138569-03 10/07/19 12:41 • (DUP) R3458990-5 10/07/19 12:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	pCi/l		%			%	
Radium-226	0.331	0.262	1	23.4	0.205		20	3
(T) Barium-133	*93.6*	*93.7*						

Laboratory Control Sample (LCS)

(LCS) R3458990-2 10/07/19 12:41

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-226	5.02	5.44	108	80.0-120	
(T) Barium-133			*99.5*		

L1138569-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1138569-01 10/07/19 12:41 • (MS) R3458990-3 10/07/19 12:41 • (MSD) R3458990-4 10/07/19 12:41

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	0.0903	20.4	20.5	101	101	1	75.0-125			0.686		20
(T) Barium-133		*105*			*104*	*94.2*							

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

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: DHLRTX	SDG#: 1140296
Cooler Received/Opened On: 9/17/19	Temperature: Amb
Received By: Hailey Melson	
Signature: Hailey M	

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?	✓		

CHAIN-OF-CUSTODY RECORD

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

H015

Work Order: 1909083

1140296

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

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

11-Sep-19

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Ra-228 E904.0	Ra-226 M7500 Ra B M	Requested Tests	
BMW-24	Aqueous	-01C	09/09/19 07:45 AM	1LHDPEHNO3	1			-01
BMW-24	Aqueous	-01D	09/09/19 07:45 AM	1LHDPEHNO3		1		02
BMW-23	Aqueous	-02C	09/09/19 08:40 AM	1LHDPEHNO3	1			
BMW-23	Aqueous	-02D	09/09/19 08:40 AM	1LHDPEHNO3		1		03
BMW-22	Aqueous	-03C	09/09/19 09:30 AM	1LHDPEHNO3	1			
BMW-22	Aqueous	-03D	09/09/19 09:30 AM	1LHDPEHNO3		1		04
BMW-33	Aqueous	-07C	09/09/19 02:05 PM	1LHDPEHNO3	1			
BMW-33	Aqueous	-07D	09/09/19 02:05 PM	1LHDPEHNO3		1		05
DUP-01	Aqueous	-08C	09/09/19 02:05 PM	1LHDPEHNO3	1			
DUP-01	Aqueous	-08D	09/09/19 02:05 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 & duponi@dhlanalytical.com

	Date/Time		Date/Time
Relinquished by:		Received by: Harley Ulm	9/17/19 10:00
Relinquished by:		Received by:	

June 22, 2020

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

Order No.: 2005169

RE: A1 Area Landfill-CCR&MNA

Dear Will Vienne:

DHL Analytical, Inc. received 1 sample(s) on 5/21/2020 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

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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

№ 68311

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: 5-20-20 PAGE 1 OF 1
PO #: DHL WORK ORDER #:
PROJECT LOCATION OR NAME: A1 AREA LANDFILL - CCR & MNA
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

PRESERVATION

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-1 ❑ Pb ❑ | RCI ❑ FLASHPOINT ❑ DGAS ❑ | TDS ❑ TSS ❑ % MOISTURE ❑ CYANIDE ❑ | APPENDIX III & IV | NO3+ Ppy, Na, Mn, K, Phenols | Perkins Fe | 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
DISCHARGE SAMPLE		5-20-20	1530	W	P/G	9		X		X		X X X X

RELINQUISHED BY: (Signature) DATE/TIME 5-20-20 1830 RECEIVED BY: (Signature) FedEX
RELINQUISHED BY: (Signature) DATE/TIME 5.21.2020 0901 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: 3.4/4.3/4.2/4.0 THERM #: 78
CUSTODY SEALS: ❑ BROKEN ☒ INTACT ❑ NOT USED
CARRIER: ❑ LONE STAR ☒ FEDEX ❑ UPS ❑ OTHER
❑ COURIER DELIVERY
❑ HAND DELIVERED

DHL COC Rev 1 | FEB 2010

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: **5/21/2020**

Work Order Number **2005169** Received by: **JH**

Checklist completed by: _____ 5/21/2020 Reviewed by (PL) 5/21/2020
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 ☐	3.4 °C/4.3/4.2/4.0
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH<2 acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____
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: A1 Area Landfill-CCR&MNA	**LRC Date:** 6/22/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2005169
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: A1 Area Landfill-CCR&MNA	**LRC Date:** 6/22/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2005169
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

06/22/20
Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *22-Jun-20*

CLIENT: Golder
Project: A1 Area Landfill-CCR&MNA
Lab Order: 2005169

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
Method M4500-P E - Orthophosphate Analysis
Method M2540C - TDS 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)
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 sample was received and log-in performed on 5/21/20. A total of 1 sample was received. The sample arrived in good condition and was properly packaged.

Exception Report R7-03

For Metals analysis performed on 5/27/20 the matrix spike and matrix spike duplicate recoveries were below control limits for Sodium. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

Exception Report S9-01

For Metals analysis performed on 5/27/20 the PDS recovery was below control limits for Sodium. 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: *22-Jun-20*

CLIENT: Golder
Project: A1 Area Landfill-CCR&MNA
Lab Order: 2005169

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2005169-01	Discharge Sample		05/20/20 03:30 PM	5/21/2020

Lab Order: 2005169
Client: Golder
Project: A1 Area Landfill-CCR&MNA

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005169-01A	Discharge Sample	05/20/20 03:30 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005169-01B	Discharge Sample	05/20/20 03:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	Discharge Sample	05/20/20 03:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	Discharge Sample	05/20/20 03:30 PM	Aqueous	SW7470A	Mercury Aq Prep	05/29/20 09:52 AM	96560
2005169-01C	Discharge Sample	05/20/20 03:30 PM	Aqueous	M2320 B	Alkalinity Preparation	05/22/20 09:11 AM	96471
	Discharge Sample	05/20/20 03:30 PM	Aqueous	E300	Anion Preparation	05/21/20 09:05 AM	96435
	Discharge Sample	05/20/20 03:30 PM	Aqueous	E300	Anion Preparation	05/21/20 09:05 AM	96435
	Discharge Sample	05/20/20 03:30 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/21/20 02:34 PM	96457
	Discharge Sample	05/20/20 03:30 PM	Aqueous	M2540C	TDS Preparation	05/21/20 11:48 AM	96451

Lab Order: 2005169
Client: Golder
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005169-01A	Discharge Sample	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	96483	1	05/22/20 03:50 PM	UV/VIS_2_200522D
	Discharge Sample	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:42 PM	UV/VIS_2_200522C
2005169-01B	Discharge Sample	Aqueous	SW7470A	Mercury Total: Aqueous	96560	1	05/31/20 03:30 PM	CETAC2_HG_200531A
	Discharge Sample	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	20	05/28/20 11:32 AM	ICP-MS5_200528A
	Discharge Sample	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	1	05/27/20 01:19 PM	ICP-MS4_200527A
2005169-01C	Discharge Sample	Aqueous	M2320 B	Alkalinity	96471	1	05/22/20 02:32 PM	TITRATOR_200522A
	Discharge Sample	Aqueous	E300	Anions by IC method - Water	96435	50	05/21/20 05:19 PM	IC2_200521A
	Discharge Sample	Aqueous	E300	Anions by IC method - Water	96435	1	05/21/20 01:53 PM	IC2_200521A
	Discharge Sample	Aqueous	M4500-P E	Orthophosphate	96457	1	05/21/20 03:24 PM	UV/VIS_2_200521C
	Discharge Sample	Aqueous	M2540C	Total Dissolved Solids	96451	1	05/21/20 04:50 PM	WC_200521B

DHL Analytical, Inc.

Date: *22-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	Discharge Sample
Project:	A1 Area Landfill-CCR&MNA	**Lab ID:**	2005169-01
Project No:	19122262-D2020	**Collection Date:**	05/20/20 03:30 PM
Lab Order:	2005169	**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	05/27/20 01:19 PM
Arsenic	0.00217	0.00200	0.00500	J	mg/L	1	05/27/20 01:19 PM
Barium	0.0830	0.00300	0.0100		mg/L	1	05/27/20 01:19 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:19 PM
Boron	15.3	0.200	0.600		mg/L	20	05/28/20 11:32 AM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:19 PM
Calcium	330	2.00	6.00		mg/L	20	05/28/20 11:32 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:19 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/27/20 01:19 PM
Iron	0.0844	0.0300	0.100	J	mg/L	1	05/27/20 01:19 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:19 PM
Lithium	0.00659	0.00500	0.0100	J	mg/L	1	05/27/20 01:19 PM
Magnesium	19.1	2.00	6.00		mg/L	20	05/28/20 11:32 AM
Molybdenum	1.04	0.00200	0.00500		mg/L	1	05/27/20 01:19 PM
Potassium	28.4	2.00	6.00		mg/L	20	05/28/20 11:32 AM
Selenium	0.0193	0.00200	0.00500		mg/L	1	05/27/20 01:19 PM
Sodium	299	2.00	6.00		mg/L	20	05/28/20 11:32 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/27/20 01:19 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/31/20 03:30 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	389	15.0	50.0		mg/L	50	05/21/20 05:19 PM
Fluoride	0.245	0.100	0.400	J	mg/L	1	05/21/20 01:53 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/21/20 01:53 PM
Sulfate	929	50.0	150		mg/L	50	05/21/20 05:19 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	75.8	10.0	20.0		mg/L @ pH 4.45	1	05/22/20 02:32 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.45	1	05/22/20 02:32 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.45	1	05/22/20 02:32 PM
Alkalinity, Total (As CaCO3)	75.8	20.0	20.0		mg/L @ pH 4.45	1	05/22/20 02:32 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.0844	0.0500	0.100	JN	mg/L	1	05/22/20 03:50 PM
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:42 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: *22-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	Discharge Sample
Project:	A1 Area Landfill-CCR&MNA	**Lab ID:**	2005169-01
Project No:	19122262-D2020	**Collection Date:**	05/20/20 03:30 PM
Lab Order:	2005169	**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	05/21/20 03:24 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2140	50.0	50.0		mg/L	1	05/21/20 04:50 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: 2005169
Project: A1 Area Landfill-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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_200531A

The QC data in batch 96560 applies to the following samples: 2005169-01B

Sample ID: **MB-96560**	Batch ID: **96560**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MBLK**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 3:05:30 PM**	Prep Date: **5/29/2020**

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

Sample ID: **LCS-96560**	Batch ID: **96560**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **LCS**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 3:07:46 PM**	Prep Date: **5/29/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00173	0.000200	0.00200	0	86.5	85	115			

Sample ID: **LCSD-96560**	Batch ID: **96560**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 3:10:02 PM**	Prep Date: **5/29/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00173	0.000200	0.00200	0	86.5	85	115	0	15	

Sample ID: **2005182-12A MS**	Batch ID: **96560**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MS**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 4:02:16 PM**	Prep Date: **5/29/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00177	0.000200	0.00200	0	88.5	80	120			

Sample ID: **2005182-12A MSD**	Batch ID: **96560**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MSD**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 4:04:32 PM**	Prep Date: **5/29/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00167	0.000200	0.00200	0	83.5	80	120	5.81	15	

Sample ID: **2005182-12A SD**	Batch ID: **96560**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **SD**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 4:06:49 PM**	Prep Date: **5/29/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID: **2005182-12A PDS**	Batch ID: **96560**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **PDS**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 4:09:05 PM**	Prep Date: **5/29/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00224	0.000200	0.00250	0	89.6	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_200531A

Sample ID: **ICV-200531**	Batch ID: **R110721**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **ICV**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 1:44:04 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00373	0.000200	0.00400	0	93.2	90	110			

Sample ID: **CCV3-200531**	Batch ID: **R110721**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 3:00:56 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: **CCV4-200531**	Batch ID: **R110721**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 3:34:59 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00205	0.000200	0.00200	0	103	90	110			

Sample ID: **CCV5-200531**	Batch ID: **R110721**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 4:11:23 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00195	0.000200	0.00200	0	97.5	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200415A

Sample ID: **DCS1-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS**	Run ID: **ICP-MS4_200415A**	Analysis Date: **4/15/2020 2:59:00 PM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.000868	0.00250	0.00100	0	86.8	70	130	0	0	
Beryllium	0.000462	0.00100	0.000500	0	92.4	70	130	0	0	
Cadmium	0.000452	0.00100	0.000500	0	90.4	70	130	0	0	
Lead	0.000467	0.00100	0.000500	0	93.4	70	130	0	0	
Thallium	0.000455	0.00150	0.000500	0	91.0	70	130	0	0	

Sample ID: **DCS2-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS2**	Run ID: **ICP-MS4_200415A**	Analysis Date: **4/15/2020 3:02:00 PM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.296	0.300	0.300	0	98.6	70	130	0	0	
Iron	0.0613	0.100	0.0500	0	123	70	130	0	0	
Magnesium	0.305	0.300	0.300	0	102	70	130	0	0	
Potassium	0.296	0.300	0.300	0	98.7	70	130	0	0	
Sodium	0.292	0.300	0.300	0	97.3	70	130	0	0	

Sample ID: **DCS3-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS3**	Run ID: **ICP-MS4_200415A**	Analysis Date: **4/15/2020 3:05:00 PM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00520	0.00500	0.00500	0	104	70	130	0	0	
Barium	0.00532	0.0100	0.00500	0	106	70	130	0	0	
Chromium	0.00563	0.00500	0.00500	0	113	70	130	0	0	
Cobalt	0.00530	0.00500	0.00500	0	106	70	130	0	0	
Lithium	0.00507	0.0100	0.00500	0	101	70	130	0	0	
Molybdenum	0.00539	0.00500	0.00500	0	108	70	130	0	0	
Selenium	0.00530	0.00500	0.00500	0	106	70	130	0	0	

Sample ID: **DCS4-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS4**	Run ID: **ICP-MS4_200415A**	Analysis Date: **4/15/2020 3:08:00 PM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0264	0.0300	0.0300	0	88.2	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_200527A**

The QC data in batch 96489 applies to the following samples: 2005169-01B

Sample ID: **MB-96489** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:01:00 PM** Prep Date: **5/26/2020**

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								
Boron	<0.0100	0.0300								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Iron	<0.0300	0.100								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Magnesium	<0.100	0.300								
Molybdenum	<0.00200	0.00500								
Potassium	<0.100	0.300								
Selenium	<0.00200	0.00500								
Sodium	<0.100	0.300								
Thallium	<0.000500	0.00150								

Sample ID: **LCS-96489** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:03:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	101	80	120			
Arsenic	0.209	0.00500	0.200	0	105	80	120			
Barium	0.201	0.0100	0.200	0	100	80	120			
Beryllium	0.204	0.00100	0.200	0	102	80	120			
Boron	0.208	0.0300	0.200	0	104	80	120			
Cadmium	0.203	0.00100	0.200	0	102	80	120			
Calcium	4.78	0.300	5.00	0	95.7	80	120			
Chromium	0.207	0.00500	0.200	0	103	80	120			
Cobalt	0.206	0.00500	0.200	0	103	80	120			
Iron	5.07	0.100	5.00	0	101	80	120			
Lead	0.202	0.00100	0.200	0	101	80	120			
Lithium	0.201	0.0100	0.200	0	100	80	120			
Magnesium	5.22	0.300	5.00	0	104	80	120			
Molybdenum	0.201	0.00500	0.200	0	101	80	120			
Potassium	5.23	0.300	5.00	0	105	80	120			
Selenium	0.212	0.00500	0.200	0	106	80	120			
Sodium	5.19	0.300	5.00	0	104	80	120			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200527A

Sample ID: **LCS-96489** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:03:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Thallium	0.204	0.00150	0.200	0	102	80	120			

Sample ID: **LCSD-96489** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:05:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.199	0.00250	0.200	0	99.7	80	120	0.837	15	
Arsenic	0.203	0.00500	0.200	0	101	80	120	3.30	15	
Barium	0.199	0.0100	0.200	0	99.6	80	120	0.685	15	
Beryllium	0.201	0.00100	0.200	0	101	80	120	1.55	15	
Boron	0.190	0.0300	0.200	0	95.2	80	120	8.80	15	
Cadmium	0.202	0.00100	0.200	0	101	80	120	0.610	15	
Calcium	4.73	0.300	5.00	0	94.6	80	120	1.11	15	
Chromium	0.201	0.00500	0.200	0	100	80	120	2.87	15	
Cobalt	0.200	0.00500	0.200	0	100	80	120	2.54	15	
Iron	4.93	0.100	5.00	0	98.6	80	120	2.81	15	
Lead	0.203	0.00100	0.200	0	102	80	120	0.679	15	
Lithium	0.192	0.0100	0.200	0	95.8	80	120	4.64	15	
Magnesium	5.05	0.300	5.00	0	101	80	120	3.41	15	
Molybdenum	0.200	0.00500	0.200	0	99.8	80	120	0.845	15	
Potassium	5.05	0.300	5.00	0	101	80	120	3.41	15	
Selenium	0.201	0.00500	0.200	0	101	80	120	5.18	15	
Sodium	5.05	0.300	5.00	0	101	80	120	2.70	15	
Thallium	0.210	0.00150	0.200	0	105	80	120	2.78	15	

Sample ID: **2005182-03A SD** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:15:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0.00114				0	20	
Arsenic	0.0286	0.0250	0	0.0285				0.444	20	
Barium	0.0161	0.0500	0	0.0171				5.87	20	
Beryllium	<0.00150	0.00500	0	0				0	20	
Boron	0.255	0.150	0	0.234				8.55	20	
Cadmium	<0.00150	0.00500	0	0				0	20	
Calcium	5.34	1.50	0	5.40				1.11	20	
Chromium	<0.0100	0.0250	0	0				0	20	
Cobalt	<0.0150	0.0250	0	0				0	20	
Iron	0.583	0.500	0	0.574				1.44	20	
Lead	<0.00150	0.00500	0	0				0	20	
Lithium	<0.0250	0.0500	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200527A

Sample ID: **2005182-03A SD**	Batch ID: **96489**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_200527A**	Analysis Date: **5/27/2020 1:15:00 PM**	Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	0.871	1.50	0	0.862				1.04	20	
Molybdenum	0.215	0.0250	0	0.220				2.13	20	
Potassium	7.96	1.50	0	7.99				0.405	20	
Selenium	<0.0100	0.0250	0	0				0	20	
Sodium	96.7	1.50	0	96.2				0.539	20	
Thallium	<0.00250	0.00750	0	0				0	20	

Sample ID: **2005182-03A PDS**	Batch ID: **96489**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_200527A**	Analysis Date: **5/27/2020 1:39:00 PM**	Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.203	0.00250	0.200	0.00114	101	75	125			
Arsenic	0.230	0.00500	0.200	0.0285	101	75	125			
Barium	0.221	0.0100	0.200	0.0171	102	75	125			
Beryllium	0.194	0.00100	0.200	0	97.0	75	125			
Boron	0.426	0.0300	0.200	0.234	95.9	75	125			
Cadmium	0.200	0.00100	0.200	0	100	75	125			
Calcium	9.80	0.300	5.00	5.40	88.1	75	125			
Chromium	0.206	0.00500	0.200	0	103	75	125			
Cobalt	0.203	0.00500	0.200	0	102	75	125			
Iron	5.46	0.100	5.00	0.574	97.7	75	125			
Lead	0.206	0.00100	0.200	0	103	75	125			
Lithium	0.186	0.0100	0.200	0	92.8	75	125			
Magnesium	5.64	0.300	5.00	0.862	95.6	75	125			
Molybdenum	0.400	0.00500	0.200	0.220	90.0	75	125			
Potassium	12.5	0.300	5.00	7.99	90.7	75	125			
Selenium	0.202	0.00500	0.200	0	101	75	125			
Sodium	92.7	0.300	5.00	96.2	-70.5	75	125			S
Thallium	0.209	0.00150	0.200	0	104	75	125			

Sample ID: **2005182-03A MS**	Batch ID: **96489**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_200527A**	Analysis Date: **5/27/2020 1:41:00 PM**	Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0.00114	100	75	125			
Arsenic	0.232	0.00500	0.200	0.0285	102	75	125			
Barium	0.218	0.0100	0.200	0.0171	100	75	125			
Beryllium	0.194	0.00100	0.200	0	97.1	75	125			
Boron	0.443	0.0300	0.200	0.234	104	75	125			
Cadmium	0.201	0.00100	0.200	0	100	75	125			
Calcium	9.99	0.300	5.00	5.40	91.8	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200527A

Sample ID: **2005182-03A MS**	Batch ID: **96489**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_200527A**	Analysis Date: **5/27/2020 1:41:00 PM**	Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.202	0.00500	0.200	0	101	75	125			
Cobalt	0.199	0.00500	0.200	0	99.7	75	125			
Iron	5.45	0.100	5.00	0.574	97.5	75	125			
Lead	0.205	0.00100	0.200	0	103	75	125			
Lithium	0.185	0.0100	0.200	0	92.3	75	125			
Magnesium	5.85	0.300	5.00	0.862	99.7	75	125			
Molybdenum	0.412	0.00500	0.200	0.220	95.7	75	125			
Potassium	13.0	0.300	5.00	7.99	100	75	125			
Selenium	0.188	0.00500	0.200	0	94.1	75	125			
Sodium	97.7	0.300	5.00	96.2	30.4	75	125			S
Thallium	0.208	0.00150	0.200	0	104	75	125			

Sample ID: **2005182-03A MSD**	Batch ID: **96489**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_200527A**	Analysis Date: **5/27/2020 1:43:00 PM**	Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.204	0.00250	0.200	0.00114	102	75	125	1.06	15	
Arsenic	0.234	0.00500	0.200	0.0285	103	75	125	0.775	15	
Barium	0.220	0.0100	0.200	0.0171	102	75	125	1.14	15	
Beryllium	0.194	0.00100	0.200	0	96.8	75	125	0.279	15	
Boron	0.446	0.0300	0.200	0.234	106	75	125	0.778	15	
Cadmium	0.198	0.00100	0.200	0	99.0	75	125	1.31	15	
Calcium	10.1	0.300	5.00	5.40	93.4	75	125	0.775	15	
Chromium	0.199	0.00500	0.200	0	99.5	75	125	1.61	15	
Cobalt	0.200	0.00500	0.200	0	100	75	125	0.356	15	
Iron	5.42	0.100	5.00	0.574	97.0	75	125	0.499	15	
Lead	0.206	0.00100	0.200	0	103	75	125	0.092	15	
Lithium	0.189	0.0100	0.200	0	94.7	75	125	2.57	15	
Magnesium	5.85	0.300	5.00	0.862	99.9	75	125	0.136	15	
Molybdenum	0.418	0.00500	0.200	0.220	98.9	75	125	1.52	15	
Potassium	12.9	0.300	5.00	7.99	99.2	75	125	0.303	15	
Selenium	0.190	0.00500	0.200	0	94.8	75	125	0.733	15	
Sodium	97.6	0.300	5.00	96.2	29.4	75	125	0.053	15	S
Thallium	0.208	0.00150	0.200	0	104	75	125	0.222	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200527A

Sample ID: **ICV-200527** Batch ID: **R110665** TestNo: **SW6020B** Units: **mg/L**
SampType: **ICV** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 12:08:00 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	0.105	0.00500	0.100	0	105	90	110			
Barium	0.102	0.0100	0.100	0	102	90	110			
Beryllium	0.103	0.00100	0.100	0	103	90	110			
Boron	0.0995	0.0300	0.100	0	99.5	90	110			
Cadmium	0.103	0.00100	0.100	0	103	90	110			
Calcium	2.48	0.300	2.50	0	99.4	90	110			
Chromium	0.107	0.00500	0.100	0	107	90	110			
Cobalt	0.107	0.00500	0.100	0	107	90	110			
Iron	2.55	0.100	2.50	0	102	90	110			
Lead	0.104	0.00100	0.100	0	104	90	110			
Lithium	0.101	0.0100	0.100	0	101	90	110			
Magnesium	2.61	0.300	2.50	0	104	90	110			
Molybdenum	0.101	0.00500	0.100	0	101	90	110			
Potassium	2.66	0.300	2.50	0	106	90	110			
Selenium	0.104	0.00500	0.100	0	104	90	110			
Sodium	2.68	0.300	2.50	0	107	90	110			
Thallium	0.104	0.00150	0.100	0	104	90	110			

Sample ID: **LCVL-200527** Batch ID: **R110665** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 12:17:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00204	0.00250	0.00200	0	102	80	120			
Arsenic	0.00510	0.00500	0.00500	0	102	80	120			
Barium	0.00529	0.0100	0.00500	0	106	80	120			
Beryllium	0.00110	0.00100	0.00100	0	110	80	120			
Boron	0.0200	0.0300	0.0200	0	99.9	80	120			
Cadmium	0.00102	0.00100	0.00100	0	102	80	120			
Calcium	0.0931	0.300	0.100	0	93.1	80	120			
Chromium	0.00516	0.00500	0.00500	0	103	80	120			
Cobalt	0.00517	0.00500	0.00500	0	103	80	120			
Iron	0.103	0.100	0.100	0	103	80	120			
Lead	0.000992	0.00100	0.00100	0	99.2	80	120			
Lithium	0.0105	0.0100	0.0100	0	105	80	120			
Magnesium	0.105	0.300	0.100	0	105	80	120			
Molybdenum	0.00526	0.00500	0.00500	0	105	80	120			
Potassium	0.103	0.300	0.100	0	103	80	120			
Selenium	0.00533	0.00500	0.00500	0	107	80	120			
Sodium	0.106	0.300	0.100	0	106	80	120			
Thallium	0.000963	0.00150	0.00100	0	96.3	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200527A

Sample ID: **CCV2-200527**	Batch ID: **R110665**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_200527A**	Analysis Date: **5/27/2020 12:57:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.198	0.00250	0.200	0	98.8	90	110			
Arsenic	0.205	0.00500	0.200	0	102	90	110			
Barium	0.200	0.0100	0.200	0	100	90	110			
Beryllium	0.206	0.00100	0.200	0	103	90	110			
Boron	0.216	0.0300	0.200	0	108	90	110			
Cadmium	0.202	0.00100	0.200	0	101	90	110			
Calcium	4.75	0.300	5.00	0	95.1	90	110			
Chromium	0.204	0.00500	0.200	0	102	90	110			
Cobalt	0.202	0.00500	0.200	0	101	90	110			
Iron	5.07	0.100	5.00	0	101	90	110			
Lead	0.200	0.00100	0.200	0	100	90	110			
Lithium	0.206	0.0100	0.200	0	103	90	110			
Magnesium	5.11	0.300	5.00	0	102	90	110			
Molybdenum	0.201	0.00500	0.200	0	101	90	110			
Potassium	5.11	0.300	5.00	0	102	90	110			
Selenium	0.207	0.00500	0.200	0	103	90	110			
Sodium	5.06	0.300	5.00	0	101	90	110			
Thallium	0.203	0.00150	0.200	0	102	90	110			

Sample ID: **CCV3-200527**	Batch ID: **R110665**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_200527A**	Analysis Date: **5/27/2020 2:09:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.196	0.00250	0.200	0	98.0	90	110			
Arsenic	0.205	0.00500	0.200	0	102	90	110			
Barium	0.198	0.0100	0.200	0	99.1	90	110			
Beryllium	0.200	0.00100	0.200	0	99.8	90	110			
Boron	0.216	0.0300	0.200	0	108	90	110			
Cadmium	0.201	0.00100	0.200	0	101	90	110			
Calcium	4.74	0.300	5.00	0	94.8	90	110			
Chromium	0.203	0.00500	0.200	0	102	90	110			
Cobalt	0.202	0.00500	0.200	0	101	90	110			
Iron	5.00	0.100	5.00	0	100	90	110			
Lead	0.200	0.00100	0.200	0	99.8	90	110			
Lithium	0.198	0.0100	0.200	0	98.8	90	110			
Magnesium	5.10	0.300	5.00	0	102	90	110			
Molybdenum	0.200	0.00500	0.200	0	100	90	110			
Potassium	5.13	0.300	5.00	0	103	90	110			
Selenium	0.205	0.00500	0.200	0	102	90	110			
Sodium	5.09	0.300	5.00	0	102	90	110			
Thallium	0.202	0.00150	0.200	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: 2005169
Project: A1 Area Landfill-CCR&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
Calcium	0.310	0.300	0.300	0	103	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: **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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200528A

Sample ID: **ICV-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 11:00:00 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	2.59	0.300	2.50	0	104	90	110			
Magnesium	2.50	0.300	2.50	0	99.8	90	110			
Potassium	2.52	0.300	2.50	0	101	90	110			
Sodium	2.63	0.300	2.50	0	105	90	110			

Sample ID: **LCVL-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 11:07:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0226	0.0300	0.0200	0	113	80	120			
Calcium	0.107	0.300	0.100	0	107	80	120			
Magnesium	0.101	0.300	0.100	0	101	80	120			
Potassium	0.0947	0.300	0.100	0	94.7	80	120			
Sodium	0.103	0.300	0.100	0	103	80	120			

Sample ID: **CCV1-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 11:56:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.201	0.0300	0.200	0	101	90	110			
Calcium	5.03	0.300	5.00	0	101	90	110			
Magnesium	5.00	0.300	5.00	0	100	90	110			
Potassium	4.94	0.300	5.00	0	98.8	90	110			
Sodium	5.09	0.300	5.00	0	102	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200519B

Sample ID: **DCS2-96406** Batch ID: **96406** TestNo: **E300** Units: **mg/L**
SampType: **DCS2** Run ID: **IC2_200519B** Analysis Date: **5/19/2020 11:56:12 AM** Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	0.440	1.00	0.5000	0	88.1	70	130	0	0	
Fluoride	0.176	0.400	0.2000	0	87.8	70	130	0	0	
Nitrate-N	0.254	0.0500	0.2500	0	102	70	130	0	0	
Sulfate	1.69	3.00	1.500	0	113	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200521A

The QC data in batch 96435 applies to the following samples: 2005169-01C

Sample ID: **MB-96435** Batch ID: **96435** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_200521A** Analysis Date: **5/21/2020 10:30:59 AM** Prep Date: **5/21/2020**

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-96435** Batch ID: **96435** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_200521A** Analysis Date: **5/21/2020 10:46:59 AM** Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.75	1.00	10.00	0	97.5	90	110			
Fluoride	3.63	0.400	4.000	0	90.8	90	110			
Nitrate-N	4.84	0.500	5.000	0	96.8	90	110			
Sulfate	29.3	3.00	30.00	0	97.6	90	110			

Sample ID: **LCSD-96435** Batch ID: **96435** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_200521A** Analysis Date: **5/21/2020 11:02:59 AM** Prep Date: **5/21/2020**

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	0.001	20	
Fluoride	3.63	0.400	4.000	0	90.8	90	110	0.005	20	
Nitrate-N	4.84	0.500	5.000	0	96.8	90	110	0.031	20	
Sulfate	29.4	3.00	30.00	0	98.1	90	110	0.443	20	

Sample ID: **2005160-01BMS** Batch ID: **96435** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_200521A** Analysis Date: **5/21/2020 3:55:49 PM** Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2180	100	2000	143.5	102	90	110			
Fluoride	2040	40.0	2000	0	102	90	110			
Nitrate-N	437	50.0	451.6	0	96.8	90	110			
Sulfate	3090	300	2000	1155	96.8	90	110			

Sample ID: **2005160-01BMSD** Batch ID: **96435** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_200521A** Analysis Date: **5/21/2020 4:11:49 PM** Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2190	100	2000	143.5	102	90	110	0.314	20	
Fluoride	2050	40.0	2000	0	102	90	110	0.462	20	
Nitrate-N	439	50.0	451.6	0	97.1	90	110	0.307	20	
Sulfate	3090	300	2000	1155	96.7	90	110	0.054	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200521A

Sample ID: **ICV-200521**	Batch ID: **R110597**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_200521A**	Analysis Date: **5/21/2020 9:58:59 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.8	1.00	25.00	0	99.4	90	110			
Fluoride	9.57	0.400	10.00	0	95.7	90	110			
Nitrate-N	12.5	0.500	12.50	0	100	90	110			
Sulfate	76.1	3.00	75.00	0	101	90	110			

Sample ID: **CCV1-200521**	Batch ID: **R110597**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200521A**	Analysis Date: **5/21/2020 3:07:49 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.88	1.00	10.00	0	98.8	90	110			
Fluoride	3.80	0.400	4.000	0	94.9	90	110			
Nitrate-N	4.91	0.500	5.000	0	98.3	90	110			
Sulfate	29.8	3.00	30.00	0	99.4	90	110			

Sample ID: **CCV2-200521**	Batch ID: **R110597**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200521A**	Analysis Date: **5/21/2020 6:23:20 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.90	1.00	10.00	0	99.0	90	110			
Fluoride	3.76	0.400	4.000	0	93.9	90	110			
Nitrate-N	4.90	0.500	5.000	0	98.0	90	110			
Sulfate	29.6	3.00	30.00	0	98.7	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **TITRATOR_200522A**

The QC data in batch 96471 applies to the following samples: 2005169-01C

Sample ID: **MB-96471** Batch ID: **96471** TestNo: **M2320 B** Units: **mg/L @ pH 4.44**
SampType: **MBLK** Run ID: **TITRATOR_200522A** Analysis Date: **5/22/2020 9:50:00 AM** Prep Date: **5/22/2020**

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-96471** Batch ID: **96471** TestNo: **M2320 B** Units: **mg/L @ pH 4.14**
SampType: **LCS** Run ID: **TITRATOR_200522A** Analysis Date: **5/22/2020 9:54:00 AM** Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	54.2	20.0	50.00	0	108	74	129			

Sample ID: **LCSD-96471** Batch ID: **96471** TestNo: **M2320 B** Units: **mg/L @ pH 4.24**
SampType: **LCSD** Run ID: **TITRATOR_200522A** Analysis Date: **5/22/2020 9:58:00 AM** Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	53.0	20.0	50.00	0	106	74	129	2.39	20	

Sample ID: **2005139-01C-DUP** Batch ID: **96471** TestNo: **M2320 B** Units: **mg/L @ pH 4.53**
SampType: **DUP** Run ID: **TITRATOR_200522A** Analysis Date: **5/22/2020 11:15:00 AM** Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	316	20.0	0	328.5				3.88	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)	316	20.0	0	328.5				3.88	20	

Sample ID: **2005141-01D-DUP** Batch ID: **96471** TestNo: **M2320 B** Units: **mg/L @ pH 4.53**
SampType: **DUP** Run ID: **TITRATOR_200522A** Analysis Date: **5/22/2020 2:00:00 PM** Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	133	20.0	0	129.0				3.28	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)	133	20.0	0	129.0				3.28	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_200522A

Sample ID: **ICV-200522**	Batch ID: **R110638**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.24**
SampType: **ICV**	Run ID: **TITRATOR_200522A**	Analysis Date: **5/22/2020 9:46:00 AM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	9.76	20.0	0							
Alkalinity, Carbonate (As CaCO3)	88.8	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	98.6	20.0	100.0	0	98.6	98	102			

Sample ID: **CCV1-200522**	Batch ID: **R110638**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.41**
SampType: **CCV**	Run ID: **TITRATOR_200522A**	Analysis Date: **5/22/2020 2:05:00 PM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	33.0	20.0	0							
Alkalinity, Carbonate (As CaCO3)	66.4	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	90	110			

Sample ID: **CCV2-200522**	Batch ID: **R110638**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.27**
SampType: **CCV**	Run ID: **TITRATOR_200522A**	Analysis Date: **5/22/2020 3:34:00 PM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	7.36	20.0	0							
Alkalinity, Carbonate (As CaCO3)	93.3	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	101	20.0	100.0	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: 2005169
Project: A1 Area Landfill-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: 2005169
Project: A1 Area Landfill-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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200521C**

The QC data in batch 96457 applies to the following samples: 2005169-01C

Sample ID: **MB-96457**	Batch ID: **96457**			TestNo: **M4500-P E**				Units: **mg/L**			
SampType: **MBLK**	Run ID: **UV/VIS_2_200521C**			Analysis Date: **5/21/2020 3:22:00 PM**				Prep Date: **5/21/2020**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Phosphorus, Total Orthophosphate (As	<0.0300	0.100									
Sample ID: **LCS-96457**	Batch ID: **96457**			TestNo: **M4500-P E**				Units: **mg/L**			
SampType: **LCS**	Run ID: **UV/VIS_2_200521C**			Analysis Date: **5/21/2020 3:23:00 PM**				Prep Date: **5/21/2020**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Phosphorus, Total Orthophosphate (As	0.523	0.100	0.5000	0	105	80	120				
Sample ID: **LCSD-96457**	Batch ID: **96457**			TestNo: **M4500-P E**				Units: **mg/L**			
SampType: **LCSD**	Run ID: **UV/VIS_2_200521C**			Analysis Date: **5/21/2020 3:23:00 PM**				Prep Date: **5/21/2020**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Phosphorus, Total Orthophosphate (As	0.524	0.100	0.5000	0	105	80	120	0.191	15		
Sample ID: **2005169-01CMS**	Batch ID: **96457**			TestNo: **M4500-P E**				Units: **mg/L**			
SampType: **MS**	Run ID: **UV/VIS_2_200521C**			Analysis Date: **5/21/2020 3:25:00 PM**				Prep Date: **5/21/2020**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Phosphorus, Total Orthophosphate (As	0.523	0.100	0.5000	0	105	80	120				
Sample ID: **2005169-01CMSD**	Batch ID: **96457**			TestNo: **M4500-P E**				Units: **mg/L**			
SampType: **MSD**	Run ID: **UV/VIS_2_200521C**			Analysis Date: **5/21/2020 3:25:00 PM**				Prep Date: **5/21/2020**			
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	80	120	2.52	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200521C**

Sample ID: **ICV-200521**	Batch ID: **R110609**	TestNo: **M4500-P E**				Units: **mg/L**	
SampType: **ICV**	Run ID: **UV/VIS_2_200521C**	Analysis Date: **5/21/2020 3:22:00 PM**				Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.202	0.100	0.2000	0	101	85	115			

Sample ID: **CCV1-200521**	Batch ID: **R110609**	TestNo: **M4500-P E**				Units: **mg/L**	
SampType: **CCV**	Run ID: **UV/VIS_2_200521C**	Analysis Date: **5/21/2020 3:28:00 PM**				Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.514	0.100	0.5000	0	103	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200522C**

The QC data in batch 96483 applies to the following samples: 2005169-01A

Sample ID: **MB-96483**	Batch ID: **96483**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MBLK**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:39:00 PM**	Prep Date: **5/22/2020**

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

Sample ID: **LCS-96483**	Batch ID: **96483**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **LCS**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:40:00 PM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0973	0.100	0.1000	0	97.3	85	115			N

Sample ID: **LCSD-96483**	Batch ID: **96483**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **LCSD**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:41:00 PM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.102	0.100	0.1000	0	102	85	115	5.07	15	N

Sample ID: **2005173-06AMS**	Batch ID: **96483**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MS**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:54:00 PM**	Prep Date: **5/22/2020**

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

Sample ID: **2005173-06AMSD**	Batch ID: **96483**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MSD**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:54:00 PM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.109	0.100	0.1000	0	109	85	115	4.88	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200522C**

Sample ID: **ICV-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:38:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0997	0.100	0.1000	0	99.7	85	115			N

Sample ID: **CCV1-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:46:00 PM**	Prep Date:

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

Sample ID: **CCV2-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:51:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.208	0.100	0.2000	0	104	85	115			N

Sample ID: **CCV3-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 5:07:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.216	0.100	0.2000	0	108	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: 2005169
Project: A1 Area Landfill-CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: WC_200521B

The QC data in batch 96451 applies to the following samples: 2005169-01C

Sample ID: **MB-96451**	Batch ID: **96451**	TestNo: **M2540C**	Units: **mg/L**
SampType: **MBLK**	Run ID: **WC_200521B**	Analysis Date: **5/21/2020 4:50:00 PM**	Prep Date: **5/21/2020**

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-96451**	Batch ID: **96451**	TestNo: **M2540C**	Units: **mg/L**
SampType: **LCS**	Run ID: **WC_200521B**	Analysis Date: **5/21/2020 4:50:00 PM**	Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	756	10.0	745.6	0	101	90	113			

Sample ID: **2005144-02D-DUP**	Batch ID: **96451**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_200521B**	Analysis Date: **5/21/2020 4:50:00 PM**	Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3510	50.0	0	3565				1.55	5	

Sample ID: **2005145-01D-DUP**	Batch ID: **96451**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_200521B**	Analysis Date: **5/21/2020 4:50:00 PM**	Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3240	50.0	0	3230				0.309	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: *22-Jun-20*

CLIENT: Golder
Work Order: 2005169
Project: A1 Area Landfill-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 4.4**	**g/L @ pH 4.4**
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 19, 2020

DHL Analytical, Inc.

Sample Delivery Group:	L1222915
Samples Received:	05/28/2020
Project Number:	2005169
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 Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



Cp: Cover Page 1

Tc: Table of Contents 2

Ss: Sample Summary 3

Cn: Case Narrative 4

Sr: Sample Results 5

DISCHARGE SAMPLE L1222915-01 5

Qc: Quality Control Summary 6

Radiochemistry by Method 904 6

Radiochemistry by Method SM7500Ra B M 7

Gl: Glossary of Terms 8

Al: Accreditations & Locations 9

Sc: Sample Chain of Custody 10

	Collected by	Collected date/time	Received date/time
DISCHARGE SAMPLE L1222915-01 Non-Potable Water		05/20/20 15:30	05/28/20 10:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1484279	1	06/02/20 13:54	06/16/20 14:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1489235	1	06/11/20 14:06	06/16/20 14:10	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1489235	1	06/11/20 14:06	06/12/20 15:10	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	-0.0813		0.614	1.01	06/16/2020 14:10	WG1484279
(T) Barium	*99.9*			*62.0-143*	*06/16/2020 14:10*	WG1484279
(T) Yttrium	*112*			*79.0-136*	*06/16/2020 14:10*	WG1484279

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.156		0.801	1.27	06/16/2020 14:10	WG1489235

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.156		0.187	0.258	06/12/2020 15:10	WG1489235
(T) Barium-133	*103*			*30.0-143*	*06/12/2020 15:10*	WG1489235

Method Blank (MB)

(MB) R3540497-1 06/16/20 09:40

Analyte	MB Result	MB Qualifier	MB MDA
	pCi/l		pCi/l
Radium-228	0.442		0.422
(T) Barium	*97.2*		
(T) Yttrium	*105*		

L1222881-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1222881-01 06/16/20 09:40 • (DUP) R3540497-5 06/16/20 09:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	pCi/l		%			%	
Radium-228	0.394	0.886	1	76.9	0.543		20	3
(T) Barium	*82.7*	*86.8*						
(T) Yttrium	*97.9*	*104*						

Laboratory Control Sample (LCS)

(LCS) R3540497-2 06/16/20 09:40

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-228	5.00	4.72	94.4	80.0-120	
(T) Barium			*83.3*		
(T) Yttrium			*97.0*		

Method Blank (MB)

(MB) R3539344-1 06/12/20 15:10

Analyte	MB Result	MB Qualifier	MB MDA
	pCi/l		pCi/l
Radium-226	-0.00387		0.0511
(T) Barium-133	*85.9*		

L1221829-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1221829-01 06/12/20 15:15 • (DUP) R3539344-5 06/12/20 15:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	pCi/l		%			%	
Radium-226	-0.0278	-0.0200	1	0.000	0.0975		20	3
(T) Barium-133	*111*	*100*						

Laboratory Control Sample (LCS)

(LCS) R3539344-2 06/12/20 15:10

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			*94.7*		

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.

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

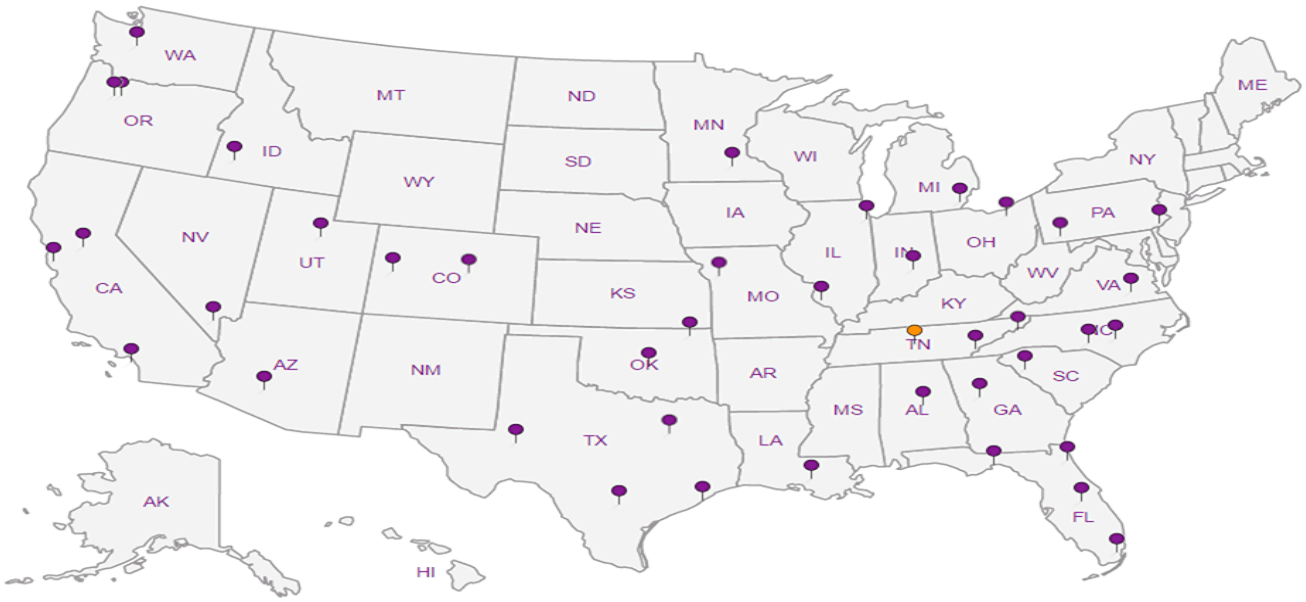
Third Party Federal Accreditations

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

G166

Work Order: 2005169

Subcontractor:

Pace Analytical
12065 Lebanon Rd
Mt. Juliet, TN 37122

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

1222915

22-May-20

Sample ID	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests					
					Ra-228	Ra-226				
					E904.0	M7500 Ra B M				
Discharge Sample	Aqueous	01D	05/20/20 03:30 PM	1LHDPEHNO3		1				-e1
Discharge Sample	Aqueous	01E	05/20/20 03:30 PM	1LHDPEHNO3	1					

Amb

General Comments:

Please analyze these samples with a Standard Turnaround Time.
Quality Control Package Needed: TRRP - SEND PDF & Excel EDD Please
EMAIL report to both cac@dhlanalytical.com & dupont@dhlanalytical.com
Call John DuPont if you have questions.

		Date/Time		Date/Time
Relinquished by:			**Received by:**	Carol Kemp 5/18/20 10:15
Relinquished by:			**Received by:**	

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: DHLRRTX	1222915	
Cooler Received/Opened On: 5/28/20 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 24, 2020

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

Order No.: 2005170

RE: A1 Area Landfill-CCR

Dear Will Vienne:

DHL Analytical, Inc. received 8 sample(s) on 5/21/2020 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

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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

№ 68312
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: 5-20-20 PAGE 1 OF 1
PO #: 19122262 DHL WORK ORDER #: 2005170
PROJECT LOCATION OR NAME: AI AREA LANDFILL - CCR
CLENT PROJECT #: 19122262 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

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION HCl	HNO_3	H_2SO_4 ❑ NaOH ❑	ICE	UNPRESERVED	ANALYSES: APPENDIX III & IV	FIELD NOTES
BMW-24	01	5-20-20	1025	W	P	4		X		X		X	
BMW-23	02		1115	W	P	4		X		X		X	
BMW-20	03		1210	W	P	4		X		X		X	
BMW-21	04		1300	W	P	4		X		X		X	
BMW-26	05		1405	W	P	4		X		X		X	
BMW-27	06		1500	W	P	4		X		X		X	
BMW-19	07		1620	W	P	4		X		X		X	
BMW-22	08		1720	W	P	4		X		X		X	

RELINQUISHED BY: (Signature) DATE/TIME 5-20-20 1830 RECEIVED BY: (Signature) FedEX
RELINQUISHED BY: (Signature) DATE/TIME 5.21.20 0901 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: 3.4, 4.3, 4.2, 4.0 THERM #: 78
CUSTODY SEALS: ❑ BROKEN ☒ INTACT ❑ NOT USED
CARRIER: ❑ LONE STAR ☒ FEDEX ❑ UPS ❑ OTHER
❑ COURIER DELIVERY
❑ HAND DELIVERED

DHL COC Rev 1 | FEB 2010

Eric Lau

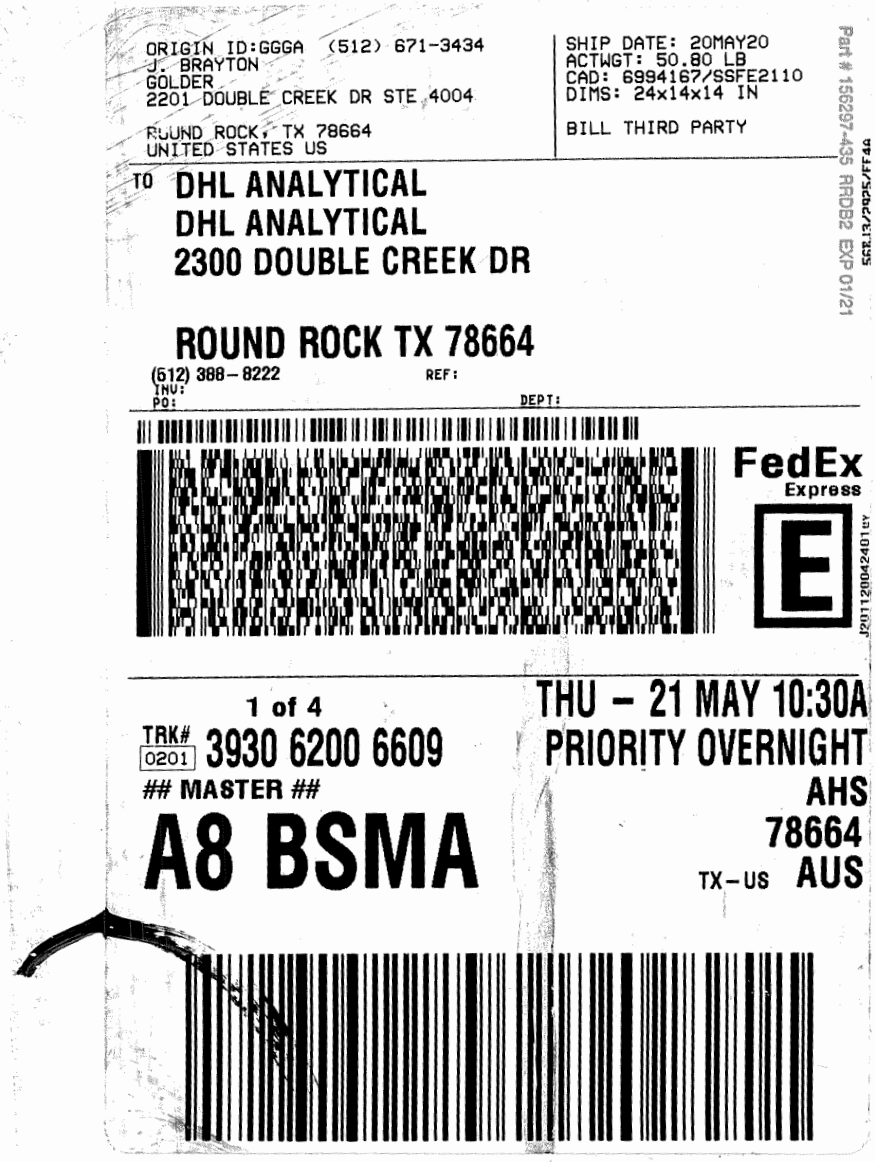
From: John DuPont
Sent: Tuesday, May 28, 2019 11:35 AM
To: Eric Lau
Subject: FW: CCR Analysis

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 STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 20MAY20
ACTWGT: 50.80 LB
CAD: 6994167/SSFE2110
DIMS: 24x14x14 IN

BILL THIRD PARTY

Part # 156297-435 RRDB2 EXP 01/21

TO DHL ANALYTICAL
DHL ANALYTICAL
2300 DOUBLE CREEK DR

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

FedEx Express

1 of 4
TRK# 0201 3930 6200 6609
MASTER
A8 BSMA

THU - 21 MAY 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

3.4

501

CUSTODY SEAL

DATE 5-20-20

SIGNATURE

DHL ANALYTICAL

Golder

ORIGIN ID:GGGA (512) 671-3434
J. BRAYTON
GOLDER
2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 20MAY20
ACTWGT: 44.05 LB
CAD: 6994167/SSFE2110
DIMS: 25x14x14 IN

BILL THIRD PARTY

Part # 156297-435 RRDB2 EXP 01/21

5GB13/2925/FF4A

TO **DHL ANALYTICAL**
DHL ANALYTICAL
2300 DOUBLE CREEK DR

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

FedEx Express

2011200424011uv

2 of 4
MPS# 0263 3930 6200 6610
Mstr# 3930 6200 6609 0201

THU - 21 MAY 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US **AUS**

A8 BSMA

4.3

512

CUSTODY SEAL

DATE 5-20-20

SIGNATURE

Be

DHL ANALYTICAL



ORIGIN ID:GGGA (512) 671-3404
J. BRAYTON
GOLDER
2201 DOUBLE CREEK DR STE 40 4
ROUND ROC.. TX 78664
UNITED STATES US

SHIP DATE: 20MAY20
ACTWGT: 53.60 LB
CAD: 6984167/SSFE2710
DIMS: 21x14x14 I

BILL THIRD PARTY

TO DHL ANALYTICAL
DHL ANALYTICAL
2300 DOUBLE CREEK DR

ROUND ROCK TX 78664
(612) 388-8222 REF:
INV:
PO: DEPT:

FedEx Express

3 of 4
MPS# 0263 3930 6200 6620
Mstr# 3930 6200 6609

THU - 21 MAY 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

A8 BSMA

4.2

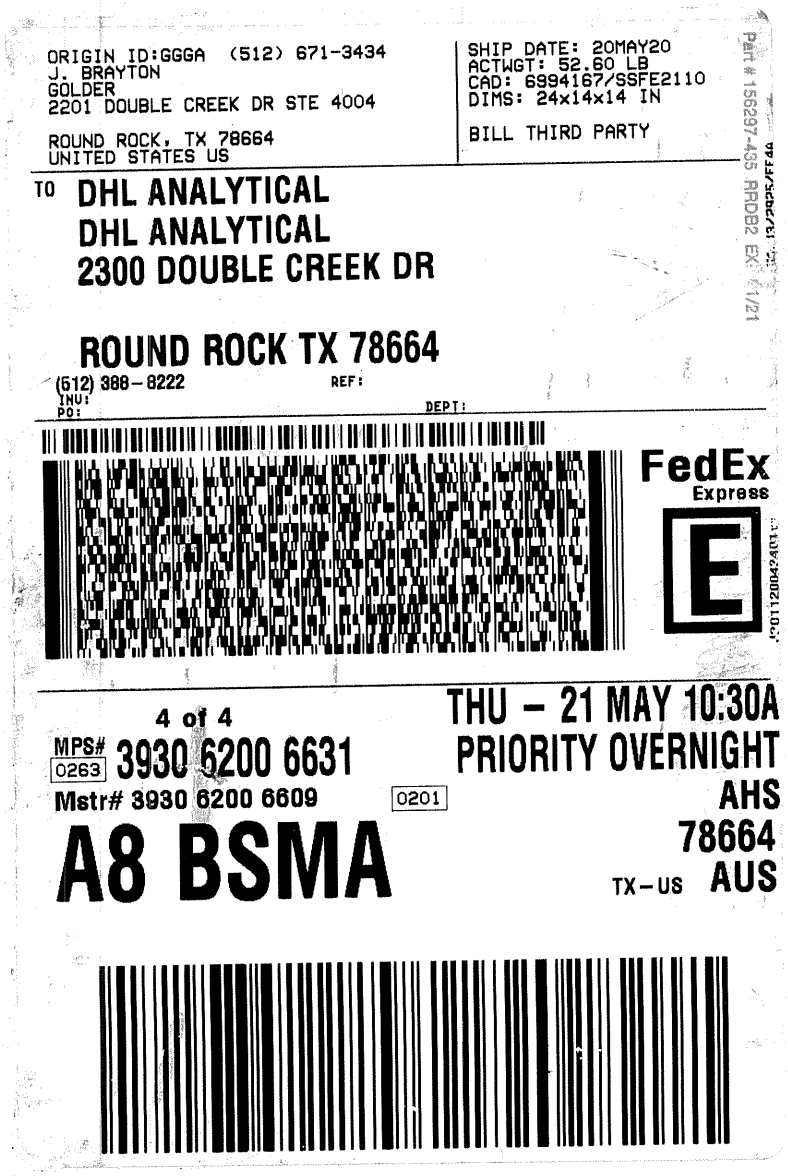
562

CUSTODY SEAL

DATE 5-20-20

SIGNATURE

DHL ANALYTICAL



ORIGIN ID:GGGA (512) 671-3434
J. BRAYTON
GOLDER
2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 20MAY20
ACTWGT: 52.60 LB
CAD: 6994167/SSFE2110
DIMS: 24x14x14 IN

BILL THIRD PARTY

TO DHL ANALYTICAL
DHL ANALYTICAL
2300 DOUBLE CREEK DR

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

FedEx Express

4 of 4
MPS# 0263 3930 6200 6631
Mstr# 3930 6200 6609 0201

THU - 21 MAY 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

A8 BSMA

4.0

692

CUSTODY SEAL

DATE 5-20-20

SIGNATURE

DHL ANALYTICAL

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Golder** Date Received: **5/21/2020**

Work Order Number **2005170** Received by: **JH**

Checklist completed by: _____ 5/21/2020 Reviewed by (BJ) 5/21/2020
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 ☐	3.4 °C/4.3/4.2/4.0
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: A1 Area Landfill-CCR	**LRC Date:** 6/24/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2005170
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: A1 Area Landfill-CCR	**LRC Date:** 6/24/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2005170
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

06/24/20
Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *24-Jun-20*

CLIENT: Golder
Project: A1 Area Landfill-CCR
Lab Order: 2005170

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 5/21/20. A total of 8 samples were received. The samples arrived in good condition and were properly packaged.

Exception Report R7-03

For Metals analysis performed on 5/28/20 and 5/29/20 (batch 96513) the matrix spike and matrix spike duplicate recoveries were out of control limits for Boron or Calcium. 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 5/28/20 (batch 96513) 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: *24-Jun-20*

CLIENT: Golder
Project: A1 Area Landfill-CCR
Lab Order: 2005170

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2005170-01	BMW-24		05/20/20 10:25 AM	5/21/2020
2005170-02	BMW-23		05/20/20 11:15 AM	5/21/2020
2005170-03	BMW-20		05/20/20 12:10 PM	5/21/2020
2005170-04	BMW-21		05/20/20 01:00 PM	5/21/2020
2005170-05	BMW-26		05/20/20 02:05 PM	5/21/2020
2005170-06	BMW-27		05/20/20 03:00 PM	5/21/2020
2005170-07	BMW-19		05/20/20 04:20 PM	5/21/2020
2005170-08	BMW-22		05/20/20 05:20 PM	5/21/2020

Lab Order: 2005170
Client: Golder
Project: A1 Area Landfill-CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005170-01A	BMW-24	05/20/20 10:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-24	05/20/20 10:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-24	05/20/20 10:25 AM	Aqueous	SW7470A	Mercury Aq Prep	05/30/20 01:00 PM	96569
2005170-01B	BMW-24	05/20/20 10:25 AM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-24	05/20/20 10:25 AM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-24	05/20/20 10:25 AM	Aqueous	M2540C	TDS Preparation	05/21/20 11:48 AM	96451
2005170-02A	BMW-23	05/20/20 11:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-23	05/20/20 11:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-23	05/20/20 11:15 AM	Aqueous	SW7470A	Mercury Aq Prep	05/30/20 01:00 PM	96569
2005170-02B	BMW-23	05/20/20 11:15 AM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-23	05/20/20 11:15 AM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-23	05/20/20 11:15 AM	Aqueous	M2540C	TDS Preparation	05/21/20 11:48 AM	96451
2005170-03A	BMW-20	05/20/20 12:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-20	05/20/20 12:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-20	05/20/20 12:10 PM	Aqueous	SW7470A	Mercury Aq Prep	05/30/20 01:00 PM	96569
2005170-03B	BMW-20	05/20/20 12:10 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-20	05/20/20 12:10 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-20	05/20/20 12:10 PM	Aqueous	M2540C	TDS Preparation	05/21/20 11:48 AM	96451
2005170-04A	BMW-21	05/20/20 01:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-21	05/20/20 01:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-21	05/20/20 01:00 PM	Aqueous	SW7470A	Mercury Aq Prep	05/30/20 01:00 PM	96569
2005170-04B	BMW-21	05/20/20 01:00 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-21	05/20/20 01:00 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-21	05/20/20 01:00 PM	Aqueous	M2540C	TDS Preparation	05/21/20 11:48 AM	96451
2005170-05A	BMW-26	05/20/20 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-26	05/20/20 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-26	05/20/20 02:05 PM	Aqueous	SW7470A	Mercury Aq Prep	05/30/20 01:00 PM	96569
2005170-05B	BMW-26	05/20/20 02:05 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496

Lab Order: 2005170
Client: Golder
Project: A1 Area Landfill-CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005170-05B	BMW-26	05/20/20 02:05 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-26	05/20/20 02:05 PM	Aqueous	M2540C	TDS Preparation	05/21/20 11:48 AM	96451
2005170-06A	BMW-27	05/20/20 03:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-27	05/20/20 03:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/26/20 07:51 AM	96489
	BMW-27	05/20/20 03:00 PM	Aqueous	SW7470A	Mercury Aq Prep	05/30/20 01:00 PM	96569
2005170-06B	BMW-27	05/20/20 03:00 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-27	05/20/20 03:00 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-27	05/20/20 03:00 PM	Aqueous	M2540C	TDS Preparation	05/21/20 11:48 AM	96451
2005170-07A	BMW-19	05/20/20 04:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-19	05/20/20 04:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-19	05/20/20 04:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-19	05/20/20 04:20 PM	Aqueous	SW7470A	Mercury Aq Prep	05/30/20 01:00 PM	96569
2005170-07B	BMW-19	05/20/20 04:20 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-19	05/20/20 04:20 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-19	05/20/20 04:20 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-19	05/20/20 04:20 PM	Aqueous	M2540C	TDS Preparation	05/21/20 11:48 AM	96451
2005170-08A	BMW-22	05/20/20 05:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-22	05/20/20 05:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-22	05/20/20 05:20 PM	Aqueous	SW7470A	Mercury Aq Prep	05/30/20 01:00 PM	96569
2005170-08B	BMW-22	05/20/20 05:20 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-22	05/20/20 05:20 PM	Aqueous	E300	Anion Preparation	05/26/20 09:22 AM	96496
	BMW-22	05/20/20 05:20 PM	Aqueous	M2540C	TDS Preparation	05/21/20 11:48 AM	96451

Lab Order: 2005170
Client: Golder
Project: A1 Area Landfill-CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005170-01A	BMW-24	Aqueous	SW7470A	Mercury Total: Aqueous	96569	1	05/31/20 05:33 PM	CETAC2_HG_200531A
	BMW-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	1	05/27/20 01:21 PM	ICP-MS4_200527A
	BMW-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	10	05/28/20 11:34 AM	ICP-MS5_200528A
2005170-01B	BMW-24	Aqueous	E300	Anions by IC method - Water	96496	10	05/26/20 06:42 PM	IC2_200526B
	BMW-24	Aqueous	E300	Anions by IC method - Water	96496	1	05/27/20 03:14 AM	IC2_200526B
	BMW-24	Aqueous	M2540C	Total Dissolved Solids	96451	1	05/21/20 04:50 PM	WC_200521B
2005170-02A	BMW-23	Aqueous	SW7470A	Mercury Total: Aqueous	96569	1	05/31/20 05:35 PM	CETAC2_HG_200531A
	BMW-23	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	1	05/27/20 01:23 PM	ICP-MS4_200527A
	BMW-23	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	10	05/28/20 11:36 AM	ICP-MS5_200528A
2005170-02B	BMW-23	Aqueous	E300	Anions by IC method - Water	96496	10	05/26/20 06:58 PM	IC2_200526B
	BMW-23	Aqueous	E300	Anions by IC method - Water	96496	1	05/27/20 03:30 AM	IC2_200526B
	BMW-23	Aqueous	M2540C	Total Dissolved Solids	96451	1	05/21/20 04:50 PM	WC_200521B
2005170-03A	BMW-20	Aqueous	SW7470A	Mercury Total: Aqueous	96569	1	05/31/20 05:37 PM	CETAC2_HG_200531A
	BMW-20	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	10	05/28/20 11:39 AM	ICP-MS5_200528A
	BMW-20	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	1	05/27/20 01:25 PM	ICP-MS4_200527A
2005170-03B	BMW-20	Aqueous	E300	Anions by IC method - Water	96496	10	05/26/20 07:14 PM	IC2_200526B
	BMW-20	Aqueous	E300	Anions by IC method - Water	96496	1	05/27/20 03:46 AM	IC2_200526B
	BMW-20	Aqueous	M2540C	Total Dissolved Solids	96451	1	05/21/20 04:50 PM	WC_200521B
2005170-04A	BMW-21	Aqueous	SW7470A	Mercury Total: Aqueous	96569	1	05/31/20 05:40 PM	CETAC2_HG_200531A
	BMW-21	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	1	05/27/20 01:27 PM	ICP-MS4_200527A
	BMW-21	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	10	05/28/20 11:41 AM	ICP-MS5_200528A
2005170-04B	BMW-21	Aqueous	E300	Anions by IC method - Water	96496	10	05/26/20 07:30 PM	IC2_200526B
	BMW-21	Aqueous	E300	Anions by IC method - Water	96496	1	05/27/20 04:02 AM	IC2_200526B
	BMW-21	Aqueous	M2540C	Total Dissolved Solids	96451	1	05/21/20 04:50 PM	WC_200521B
2005170-05A	BMW-26	Aqueous	SW7470A	Mercury Total: Aqueous	96569	1	05/31/20 05:42 PM	CETAC2_HG_200531A
	BMW-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	20	05/28/20 11:43 AM	ICP-MS5_200528A

Lab Order: 2005170
Client: Golder
Project: A1 Area Landfill-CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005170-05A	BMW-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	1	05/27/20 01:29 PM	ICP-MS4_200527A
2005170-05B	BMW-26	Aqueous	E300	Anions by IC method - Water	96496	10	05/26/20 07:46 PM	IC2_200526B
	BMW-26	Aqueous	E300	Anions by IC method - Water	96496	1	05/27/20 04:18 AM	IC2_200526B
	BMW-26	Aqueous	M2540C	Total Dissolved Solids	96451	1	05/21/20 04:50 PM	WC_200521B
2005170-06A	BMW-27	Aqueous	SW7470A	Mercury Total: Aqueous	96569	1	05/31/20 05:44 PM	CETAC2_HG_200531A
	BMW-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	1	05/27/20 01:31 PM	ICP-MS4_200527A
	BMW-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96489	10	05/28/20 11:45 AM	ICP-MS5_200528A
2005170-06B	BMW-27	Aqueous	E300	Anions by IC method - Water	96496	10	05/26/20 08:02 PM	IC2_200526B
	BMW-27	Aqueous	E300	Anions by IC method - Water	96496	1	05/27/20 04:34 AM	IC2_200526B
	BMW-27	Aqueous	M2540C	Total Dissolved Solids	96451	1	05/21/20 04:50 PM	WC_200521B
2005170-07A	BMW-19	Aqueous	SW7470A	Mercury Total: Aqueous	96569	1	05/31/20 05:46 PM	CETAC2_HG_200531A
	BMW-19	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 12:52 PM	ICP-MS5_200528A
	BMW-19	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	50	05/29/20 01:02 PM	ICP-MS4_200529A
	BMW-19	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/29/20 01:04 PM	ICP-MS4_200529A
2005170-07B	BMW-19	Aqueous	E300	Anions by IC method - Water	96496	100	05/26/20 06:10 PM	IC2_200526B
	BMW-19	Aqueous	E300	Anions by IC method - Water	96496	10	05/26/20 08:18 PM	IC2_200526B
	BMW-19	Aqueous	E300	Anions by IC method - Water	96496	1	05/27/20 04:50 AM	IC2_200526B
	BMW-19	Aqueous	M2540C	Total Dissolved Solids	96451	1	05/21/20 04:50 PM	WC_200521B
2005170-08A	BMW-22	Aqueous	SW7470A	Mercury Total: Aqueous	96569	1	05/31/20 05:49 PM	CETAC2_HG_200531A
	BMW-22	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	20	05/29/20 01:06 PM	ICP-MS4_200529A
	BMW-22	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 12:54 PM	ICP-MS5_200528A
2005170-08B	BMW-22	Aqueous	E300	Anions by IC method - Water	96496	10	05/26/20 08:34 PM	IC2_200526B
	BMW-22	Aqueous	E300	Anions by IC method - Water	96496	1	05/27/20 05:06 AM	IC2_200526B
	BMW-22	Aqueous	M2540C	Total Dissolved Solids	96451	1	05/21/20 04:50 PM	WC_200521B

DHL Analytical, Inc.

Date: *24-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-24
Project:	A1 Area Landfill-CCR	**Lab ID:**	2005170-01
Project No:	19122262-D2020	**Collection Date:**	05/20/20 10:25 AM
Lab Order:	2005170	**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	05/27/20 01:21 PM
Arsenic	0.00207	0.00200	0.00500	J	mg/L	1	05/27/20 01:21 PM
Barium	0.244	0.00300	0.0100		mg/L	1	05/27/20 01:21 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:21 PM
Boron	0.758	0.0100	0.0300		mg/L	1	05/27/20 01:21 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:21 PM
Calcium	67.8	1.00	3.00		mg/L	10	05/28/20 11:34 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:21 PM
Cobalt	0.0109	0.00300	0.00500		mg/L	1	05/27/20 01:21 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:21 PM
Lithium	0.0460	0.00500	0.0100		mg/L	1	05/27/20 01:21 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:21 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:21 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/27/20 01:21 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/31/20 05:33 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	175	3.00	10.0		mg/L	10	05/26/20 06:42 PM
Fluoride	0.129	0.100	0.400	J	mg/L	1	05/27/20 03:14 AM
Sulfate	254	10.0	30.0		mg/L	10	05/26/20 06:42 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	907	10.0	10.0		mg/L	1	05/21/20 04:50 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: *24-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-23
Project:	A1 Area Landfill-CCR	**Lab ID:**	2005170-02
Project No:	19122262-D2020	**Collection Date:**	05/20/20 11:15 AM
Lab Order:	2005170	**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	05/27/20 01:23 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:23 PM
Barium	0.0390	0.00300	0.0100		mg/L	1	05/27/20 01:23 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:23 PM
Boron	1.63	0.0100	0.0300		mg/L	1	05/27/20 01:23 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:23 PM
Calcium	105	1.00	3.00		mg/L	10	05/28/20 11:36 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:23 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/27/20 01:23 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:23 PM
Lithium	0.0927	0.00500	0.0100		mg/L	1	05/27/20 01:23 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:23 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:23 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/27/20 01:23 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/31/20 05:35 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	256	3.00	10.0		mg/L	10	05/26/20 06:58 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/27/20 03:30 AM
Sulfate	494	10.0	30.0		mg/L	10	05/26/20 06:58 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1580	50.0	50.0		mg/L	1	05/21/20 04:50 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: *24-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-20
Project:	A1 Area Landfill-CCR	**Lab ID:**	2005170-03
Project No:	19122262-D2020	**Collection Date:**	05/20/20 12:10 PM
Lab Order:	2005170	**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	05/27/20 01:25 PM
Arsenic	0.0126	0.00200	0.00500		mg/L	1	05/27/20 01:25 PM
Barium	0.0494	0.00300	0.0100		mg/L	1	05/27/20 01:25 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:25 PM
Boron	0.179	0.0100	0.0300		mg/L	1	05/27/20 01:25 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:25 PM
Calcium	162	1.00	3.00		mg/L	10	05/28/20 11:39 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:25 PM
Cobalt	0.0912	0.00300	0.00500		mg/L	1	05/27/20 01:25 PM
Lead	0.000956	0.000300	0.00100	J	mg/L	1	05/27/20 01:25 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	05/27/20 01:25 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:25 PM
Selenium	0.00440	0.00200	0.00500	J	mg/L	1	05/27/20 01:25 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/27/20 01:25 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/31/20 05:37 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	35.8	0.300	1.00		mg/L	1	05/27/20 03:46 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/27/20 03:46 AM
Sulfate	797	10.0	30.0		mg/L	10	05/26/20 07:14 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1450	50.0	50.0		mg/L	1	05/21/20 04:50 PM

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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: *24-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-21
Project:	A1 Area Landfill-CCR	**Lab ID:**	2005170-04
Project No:	19122262-D2020	**Collection Date:**	05/20/20 01:00 PM
Lab Order:	2005170	**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	05/27/20 01:27 PM
Arsenic	0.00434	0.00200	0.00500	J	mg/L	1	05/27/20 01:27 PM
Barium	0.0421	0.00300	0.0100		mg/L	1	05/27/20 01:27 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:27 PM
Boron	1.07	0.0100	0.0300		mg/L	1	05/27/20 01:27 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:27 PM
Calcium	166	1.00	3.00		mg/L	10	05/28/20 11:41 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:27 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/27/20 01:27 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:27 PM
Lithium	0.0632	0.00500	0.0100		mg/L	1	05/27/20 01:27 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:27 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:27 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/27/20 01:27 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/31/20 05:40 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	416	3.00	10.0		mg/L	10	05/26/20 07:30 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/27/20 04:02 AM
Sulfate	457	10.0	30.0		mg/L	10	05/26/20 07:30 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1910	50.0	50.0		mg/L	1	05/21/20 04:50 PM

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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: *24-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-26
Project:	A1 Area Landfill-CCR	**Lab ID:**	2005170-05
Project No:	19122262-D2020	**Collection Date:**	05/20/20 02:05 PM
Lab Order:	2005170	**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	05/27/20 01:29 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:29 PM
Barium	0.0293	0.00300	0.0100		mg/L	1	05/27/20 01:29 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:29 PM
Boron	0.547	0.0100	0.0300		mg/L	1	05/27/20 01:29 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:29 PM
Calcium	252	2.00	6.00		mg/L	20	05/28/20 11:43 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:29 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/27/20 01:29 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:29 PM
Lithium	0.0999	0.00500	0.0100		mg/L	1	05/27/20 01:29 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:29 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:29 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/27/20 01:29 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/31/20 05:42 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	131	3.00	10.0		mg/L	10	05/26/20 07:46 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/27/20 04:18 AM
Sulfate	701	10.0	30.0		mg/L	10	05/26/20 07:46 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1980	50.0	50.0		mg/L	1	05/21/20 04:50 PM

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SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *24-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-27
Project:	A1 Area Landfill-CCR	**Lab ID:**	2005170-06
Project No:	19122262-D2020	**Collection Date:**	05/20/20 03:00 PM
Lab Order:	2005170	**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	05/27/20 01:31 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:31 PM
Barium	0.0250	0.00300	0.0100		mg/L	1	05/27/20 01:31 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:31 PM
Boron	0.460	0.0100	0.0300		mg/L	1	05/27/20 01:31 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:31 PM
Calcium	213	1.00	3.00		mg/L	10	05/28/20 11:45 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:31 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/27/20 01:31 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/27/20 01:31 PM
Lithium	0.0840	0.00500	0.0100		mg/L	1	05/27/20 01:31 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:31 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/27/20 01:31 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/27/20 01:31 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/31/20 05:44 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	108	3.00	10.0		mg/L	10	05/26/20 08:02 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/27/20 04:34 AM
Sulfate	579	10.0	30.0		mg/L	10	05/26/20 08:02 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1670	50.0	50.0		mg/L	1	05/21/20 04:50 PM

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DHL Analytical, Inc.

Date: *24-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-19
Project:	A1 Area Landfill-CCR	**Lab ID:**	2005170-07
Project No:	19122262-D2020	**Collection Date:**	05/20/20 04:20 PM
Lab Order:	2005170	**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	05/28/20 12:52 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/28/20 12:52 PM
Barium	0.0109	0.00300	0.0100		mg/L	1	05/28/20 12:52 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/28/20 12:52 PM
Boron	0.487	0.0100	0.0300		mg/L	1	05/29/20 01:04 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/28/20 12:52 PM
Calcium	445	5.00	15.0		mg/L	50	05/29/20 01:02 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/28/20 12:52 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/28/20 12:52 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/28/20 12:52 PM
Lithium	0.0783	0.00500	0.0100		mg/L	1	05/28/20 12:52 PM
Molybdenum	0.00231	0.00200	0.00500	J	mg/L	1	05/28/20 12:52 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/28/20 12:52 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/28/20 12:52 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/31/20 05:46 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	5.54	0.300	1.00		mg/L	1	05/27/20 04:50 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/27/20 04:50 AM
Sulfate	2020	100	300		mg/L	100	05/26/20 06:10 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3470	50.0	50.0		mg/L	1	05/21/20 04:50 PM

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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: *24-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-22
Project:	A1 Area Landfill-CCR	**Lab ID:**	2005170-08
Project No:	19122262-D2020	**Collection Date:**	05/20/20 05:20 PM
Lab Order:	2005170	**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	05/28/20 12:54 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/28/20 12:54 PM
Barium	0.0621	0.00300	0.0100		mg/L	1	05/28/20 12:54 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/28/20 12:54 PM
Boron	3.67	0.200	0.600		mg/L	20	05/29/20 01:06 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/28/20 12:54 PM
Calcium	205	2.00	6.00		mg/L	20	05/29/20 01:06 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/28/20 12:54 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/28/20 12:54 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/28/20 12:54 PM
Lithium	0.0855	0.00500	0.0100		mg/L	1	05/28/20 12:54 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/28/20 12:54 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/28/20 12:54 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/28/20 12:54 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/31/20 05:49 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	290	3.00	10.0		mg/L	10	05/26/20 08:34 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/27/20 05:06 AM
Sulfate	906	10.0	30.0		mg/L	10	05/26/20 08:34 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2230	50.0	50.0		mg/L	1	05/21/20 04:50 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: 2005170
Project: A1 Area Landfill-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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_200531A

The QC data in batch 96569 applies to the following samples: 2005170-01A, 2005170-02A, 2005170-03A, 2005170-04A, 2005170-05A, 2005170-06A, 2005170-07A, 2005170-08A

Sample ID: **MB-96569**	Batch ID: **96569**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MBLK**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 5:26:25 PM**	Prep Date: **5/30/2020**

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

Sample ID: **LCS-96569**	Batch ID: **96569**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **LCS**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 5:28:41 PM**	Prep Date: **5/30/2020**

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-96569**	Batch ID: **96569**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 5:30:57 PM**	Prep Date: **5/30/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00190	0.000200	0.00200	0	95.0	85	115	1.59	15	

Sample ID: **2005182-12B MS**	Batch ID: **96569**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MS**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 5:53:36 PM**	Prep Date: **5/30/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00173	0.000200	0.00200	0	86.5	80	120			

Sample ID: **2005182-12B MSD**	Batch ID: **96569**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MSD**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 5:55:51 PM**	Prep Date: **5/30/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00178	0.000200	0.00200	0	89.0	80	120	2.85	15	

Sample ID: **2005182-12B SD**	Batch ID: **96569**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **SD**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 5:58:08 PM**	Prep Date: **5/30/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID: **2005182-12B PDS**	Batch ID: **96569**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **PDS**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 6:00:24 PM**	Prep Date: **5/30/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00218	0.000200	0.00250	0	87.2	85	115			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_200531A

Sample ID: **ICV-200531**	Batch ID: **R110721**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **ICV**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 1:44:04 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00373	0.000200	0.00400	0	93.2	90	110			

Sample ID: **CCV7-200531**	Batch ID: **R110721**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 5:21:51 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00201	0.000200	0.00200	0	101	90	110			

Sample ID: **CCV8-200531**	Batch ID: **R110721**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_200531A**	Analysis Date: **5/31/2020 6:04:58 PM**	Prep Date:

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

Qualifiers:

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

CLIENT: Golder
Work Order: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200415A

Sample ID: **DCS1-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS**	Run ID: **ICP-MS4_200415A**	Analysis Date: **4/15/2020 2:59:00 PM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.000868	0.00250	0.00100	0	86.8	70	130	0	0	
Beryllium	0.000462	0.00100	0.000500	0	92.4	70	130	0	0	
Cadmium	0.000452	0.00100	0.000500	0	90.4	70	130	0	0	
Lead	0.000467	0.00100	0.000500	0	93.4	70	130	0	0	
Thallium	0.000455	0.00150	0.000500	0	91.0	70	130	0	0	

Sample ID: **DCS2-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS2**	Run ID: **ICP-MS4_200415A**	Analysis Date: **4/15/2020 3:02:00 PM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.296	0.300	0.300	0	98.6	70	130	0	0	

Sample ID: **DCS3-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS3**	Run ID: **ICP-MS4_200415A**	Analysis Date: **4/15/2020 3:05:00 PM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00520	0.00500	0.00500	0	104	70	130	0	0	
Barium	0.00532	0.0100	0.00500	0	106	70	130	0	0	
Chromium	0.00563	0.00500	0.00500	0	113	70	130	0	0	
Cobalt	0.00530	0.00500	0.00500	0	106	70	130	0	0	
Lithium	0.00507	0.0100	0.00500	0	101	70	130	0	0	
Molybdenum	0.00539	0.00500	0.00500	0	108	70	130	0	0	
Selenium	0.00530	0.00500	0.00500	0	106	70	130	0	0	

Sample ID: **DCS4-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS4**	Run ID: **ICP-MS4_200415A**	Analysis Date: **4/15/2020 3:08:00 PM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0264	0.0300	0.0300	0	88.2	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200527A

The QC data in batch 96489 applies to the following samples: 2005170-01A, 2005170-02A, 2005170-03A, 2005170-04A, 2005170-05A, 2005170-06A

Sample ID: **MB-96489** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:01:00 PM** Prep Date: **5/26/2020**

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								
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								

Sample ID: **LCS-96489** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:03:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	101	80	120			
Arsenic	0.209	0.00500	0.200	0	105	80	120			
Barium	0.201	0.0100	0.200	0	100	80	120			
Beryllium	0.204	0.00100	0.200	0	102	80	120			
Boron	0.208	0.0300	0.200	0	104	80	120			
Cadmium	0.203	0.00100	0.200	0	102	80	120			
Calcium	4.78	0.300	5.00	0	95.7	80	120			
Chromium	0.207	0.00500	0.200	0	103	80	120			
Cobalt	0.206	0.00500	0.200	0	103	80	120			
Lead	0.202	0.00100	0.200	0	101	80	120			
Lithium	0.201	0.0100	0.200	0	100	80	120			
Molybdenum	0.201	0.00500	0.200	0	101	80	120			
Selenium	0.212	0.00500	0.200	0	106	80	120			
Thallium	0.204	0.00150	0.200	0	102	80	120			

Sample ID: **LCSD-96489** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:05:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.199	0.00250	0.200	0	99.7	80	120	0.837	15	
Arsenic	0.203	0.00500	0.200	0	101	80	120	3.30	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200527A

Sample ID: **LCSD-96489** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:05:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.199	0.0100	0.200	0	99.6	80	120	0.685	15	
Beryllium	0.201	0.00100	0.200	0	101	80	120	1.55	15	
Boron	0.190	0.0300	0.200	0	95.2	80	120	8.80	15	
Cadmium	0.202	0.00100	0.200	0	101	80	120	0.610	15	
Calcium	4.73	0.300	5.00	0	94.6	80	120	1.11	15	
Chromium	0.201	0.00500	0.200	0	100	80	120	2.87	15	
Cobalt	0.200	0.00500	0.200	0	100	80	120	2.54	15	
Lead	0.203	0.00100	0.200	0	102	80	120	0.679	15	
Lithium	0.192	0.0100	0.200	0	95.8	80	120	4.64	15	
Molybdenum	0.200	0.00500	0.200	0	99.8	80	120	0.845	15	
Selenium	0.201	0.00500	0.200	0	101	80	120	5.18	15	
Thallium	0.210	0.00150	0.200	0	105	80	120	2.78	15	

Sample ID: **2005182-03A SD** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:15:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0.00114				0	20	
Arsenic	0.0286	0.0250	0	0.0285				0.444	20	
Barium	0.0161	0.0500	0	0.0171				5.87	20	
Beryllium	<0.00150	0.00500	0	0				0	20	
Boron	0.255	0.150	0	0.234				8.55	20	
Cadmium	<0.00150	0.00500	0	0				0	20	
Calcium	5.34	1.50	0	5.40				1.11	20	
Chromium	<0.0100	0.0250	0	0				0	20	
Cobalt	<0.0150	0.0250	0	0				0	20	
Lead	<0.00150	0.00500	0	0				0	20	
Lithium	<0.0250	0.0500	0	0				0	20	
Molybdenum	0.215	0.0250	0	0.220				2.13	20	
Selenium	<0.0100	0.0250	0	0				0	20	
Thallium	<0.00250	0.00750	0	0				0	20	

Sample ID: **2005182-03A PDS** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:39:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.203	0.00250	0.200	0.00114	101	75	125			
Arsenic	0.230	0.00500	0.200	0.0285	101	75	125			
Barium	0.221	0.0100	0.200	0.0171	102	75	125			
Beryllium	0.194	0.00100	0.200	0	97.0	75	125			
Boron	0.426	0.0300	0.200	0.234	95.9	75	125			

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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200527A

Sample ID: **2005182-03A PDS** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:39:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.200	0.00100	0.200	0	100	75	125			
Calcium	9.80	0.300	5.00	5.40	88.1	75	125			
Chromium	0.206	0.00500	0.200	0	103	75	125			
Cobalt	0.203	0.00500	0.200	0	102	75	125			
Lead	0.206	0.00100	0.200	0	103	75	125			
Lithium	0.186	0.0100	0.200	0	92.8	75	125			
Molybdenum	0.400	0.00500	0.200	0.220	90.0	75	125			
Selenium	0.202	0.00500	0.200	0	101	75	125			
Thallium	0.209	0.00150	0.200	0	104	75	125			

Sample ID: **2005182-03A MS** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:41:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0.00114	100	75	125			
Arsenic	0.232	0.00500	0.200	0.0285	102	75	125			
Barium	0.218	0.0100	0.200	0.0171	100	75	125			
Beryllium	0.194	0.00100	0.200	0	97.1	75	125			
Boron	0.443	0.0300	0.200	0.234	104	75	125			
Cadmium	0.201	0.00100	0.200	0	100	75	125			
Calcium	9.99	0.300	5.00	5.40	91.8	75	125			
Chromium	0.202	0.00500	0.200	0	101	75	125			
Cobalt	0.199	0.00500	0.200	0	99.7	75	125			
Lead	0.205	0.00100	0.200	0	103	75	125			
Lithium	0.185	0.0100	0.200	0	92.3	75	125			
Molybdenum	0.412	0.00500	0.200	0.220	95.7	75	125			
Selenium	0.188	0.00500	0.200	0	94.1	75	125			
Thallium	0.208	0.00150	0.200	0	104	75	125			

Sample ID: **2005182-03A MSD** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:43:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.204	0.00250	0.200	0.00114	102	75	125	1.06	15	
Arsenic	0.234	0.00500	0.200	0.0285	103	75	125	0.775	15	
Barium	0.220	0.0100	0.200	0.0171	102	75	125	1.14	15	
Beryllium	0.194	0.00100	0.200	0	96.8	75	125	0.279	15	
Boron	0.446	0.0300	0.200	0.234	106	75	125	0.778	15	
Cadmium	0.198	0.00100	0.200	0	99.0	75	125	1.31	15	
Calcium	10.1	0.300	5.00	5.40	93.4	75	125	0.775	15	
Chromium	0.199	0.00500	0.200	0	99.5	75	125	1.61	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200527A

Sample ID: **2005182-03A MSD** Batch ID: **96489** TestNo: **SW6020B** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 1:43:00 PM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.200	0.00500	0.200	0	100	75	125	0.356	15	
Lead	0.206	0.00100	0.200	0	103	75	125	0.092	15	
Lithium	0.189	0.0100	0.200	0	94.7	75	125	2.57	15	
Molybdenum	0.418	0.00500	0.200	0.220	98.9	75	125	1.52	15	
Selenium	0.190	0.00500	0.200	0	94.8	75	125	0.733	15	
Thallium	0.208	0.00150	0.200	0	104	75	125	0.222	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200527A

Sample ID: **ICV-200527** Batch ID: **R110665** TestNo: **SW6020B** Units: **mg/L**
SampType: **ICV** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 12:08:00 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	0.105	0.00500	0.100	0	105	90	110			
Barium	0.102	0.0100	0.100	0	102	90	110			
Beryllium	0.103	0.00100	0.100	0	103	90	110			
Boron	0.0995	0.0300	0.100	0	99.5	90	110			
Cadmium	0.103	0.00100	0.100	0	103	90	110			
Calcium	2.48	0.300	2.50	0	99.4	90	110			
Chromium	0.107	0.00500	0.100	0	107	90	110			
Cobalt	0.107	0.00500	0.100	0	107	90	110			
Lead	0.104	0.00100	0.100	0	104	90	110			
Lithium	0.101	0.0100	0.100	0	101	90	110			
Molybdenum	0.101	0.00500	0.100	0	101	90	110			
Selenium	0.104	0.00500	0.100	0	104	90	110			
Thallium	0.104	0.00150	0.100	0	104	90	110			

Sample ID: **LCVL-200527** Batch ID: **R110665** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 12:17:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00204	0.00250	0.00200	0	102	80	120			
Arsenic	0.00510	0.00500	0.00500	0	102	80	120			
Barium	0.00529	0.0100	0.00500	0	106	80	120			
Beryllium	0.00110	0.00100	0.00100	0	110	80	120			
Boron	0.0200	0.0300	0.0200	0	99.9	80	120			
Cadmium	0.00102	0.00100	0.00100	0	102	80	120			
Calcium	0.0931	0.300	0.100	0	93.1	80	120			
Chromium	0.00516	0.00500	0.00500	0	103	80	120			
Cobalt	0.00517	0.00500	0.00500	0	103	80	120			
Lead	0.000992	0.00100	0.00100	0	99.2	80	120			
Lithium	0.0105	0.0100	0.0100	0	105	80	120			
Molybdenum	0.00526	0.00500	0.00500	0	105	80	120			
Selenium	0.00533	0.00500	0.00500	0	107	80	120			
Thallium	0.000963	0.00150	0.00100	0	96.3	80	120			

Sample ID: **CCV2-200527** Batch ID: **R110665** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_200527A** Analysis Date: **5/27/2020 12:57:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.198	0.00250	0.200	0	98.8	90	110			
Arsenic	0.205	0.00500	0.200	0	102	90	110			
Barium	0.200	0.0100	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200527A

Sample ID: **CCV2-200527**	Batch ID: **R110665**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_200527A**	Analysis Date: **5/27/2020 12:57:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.206	0.00100	0.200	0	103	90	110			
Boron	0.216	0.0300	0.200	0	108	90	110			
Cadmium	0.202	0.00100	0.200	0	101	90	110			
Calcium	4.75	0.300	5.00	0	95.1	90	110			
Chromium	0.204	0.00500	0.200	0	102	90	110			
Cobalt	0.202	0.00500	0.200	0	101	90	110			
Lead	0.200	0.00100	0.200	0	100	90	110			
Lithium	0.206	0.0100	0.200	0	103	90	110			
Molybdenum	0.201	0.00500	0.200	0	101	90	110			
Selenium	0.207	0.00500	0.200	0	103	90	110			
Thallium	0.203	0.00150	0.200	0	102	90	110			

Sample ID: **CCV3-200527**	Batch ID: **R110665**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_200527A**	Analysis Date: **5/27/2020 2:09:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.196	0.00250	0.200	0	98.0	90	110			
Arsenic	0.205	0.00500	0.200	0	102	90	110			
Barium	0.198	0.0100	0.200	0	99.1	90	110			
Beryllium	0.200	0.00100	0.200	0	99.8	90	110			
Boron	0.216	0.0300	0.200	0	108	90	110			
Cadmium	0.201	0.00100	0.200	0	101	90	110			
Calcium	4.74	0.300	5.00	0	94.8	90	110			
Chromium	0.203	0.00500	0.200	0	102	90	110			
Cobalt	0.202	0.00500	0.200	0	101	90	110			
Lead	0.200	0.00100	0.200	0	99.8	90	110			
Lithium	0.198	0.0100	0.200	0	98.8	90	110			
Molybdenum	0.200	0.00500	0.200	0	100	90	110			
Selenium	0.205	0.00500	0.200	0	102	90	110			
Thallium	0.202	0.00150	0.200	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_200529A**

The QC data in batch 96513 applies to the following samples: 2005170-07A, 2005170-08A

Sample ID: **MB-96513**	Batch ID: **96513**			TestNo: **SW6020B**				Units: **mg/L**			
SampType: **MBLK**	Run ID: **ICP-MS4_200529A**			Analysis Date: **5/29/2020 12:50:00 PM**				Prep Date: **5/27/2020**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Boron	<0.0100	0.0300									
Sample ID: **LCS-96513**	Batch ID: **96513**			TestNo: **SW6020B**				Units: **mg/L**			
SampType: **LCS**	Run ID: **ICP-MS4_200529A**			Analysis Date: **5/29/2020 12:52:00 PM**				Prep Date: **5/27/2020**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Boron	0.202	0.0300	0.200	0	101	80	120				
Sample ID: **LCSD-96513**	Batch ID: **96513**			TestNo: **SW6020B**				Units: **mg/L**			
SampType: **LCSD**	Run ID: **ICP-MS4_200529A**			Analysis Date: **5/29/2020 12:54:00 PM**				Prep Date: **5/27/2020**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Boron	0.204	0.0300	0.200	0	102	80	120	1.11	15		
Sample ID: **2005196-06B SD**	Batch ID: **96513**			TestNo: **SW6020B**				Units: **mg/L**			
SampType: **SD**	Run ID: **ICP-MS4_200529A**			Analysis Date: **5/29/2020 1:00:00 PM**				Prep Date: **5/27/2020**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Boron	<2.50	7.50	0	1.41				0	20		
Sample ID: **2005196-06B PDS**	Batch ID: **96513**			TestNo: **SW6020B**				Units: **mg/L**			
SampType: **PDS**	Run ID: **ICP-MS4_200529A**			Analysis Date: **5/29/2020 1:20:00 PM**				Prep Date: **5/27/2020**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Boron	12.2	1.50	10.0	1.41	108	75	125				
Sample ID: **2005196-06B MS**	Batch ID: **96513**			TestNo: **SW6020B**				Units: **mg/L**			
SampType: **MS**	Run ID: **ICP-MS4_200529A**			Analysis Date: **5/29/2020 1:22:00 PM**				Prep Date: **5/27/2020**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Boron	1.90	1.50	0.200	1.41	247	75	125				S
Sample ID: **2005196-06B MSD**	Batch ID: **96513**			TestNo: **SW6020B**				Units: **mg/L**			
SampType: **MSD**	Run ID: **ICP-MS4_200529A**			Analysis Date: **5/29/2020 1:24:00 PM**				Prep Date: **5/27/2020**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Boron	1.65	1.50	0.200	1.41	124	75	125	13.9	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200529A

Sample ID: **ICV-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 11:56:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.106	0.0300	0.100	0	106	90	110			
Calcium	2.51	0.300	2.50	0	100	90	110			

Sample ID: **LCVL-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 12:09:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0202	0.0300	0.0200	0	101	80	120			
Calcium	0.0988	0.300	0.100	0	98.8	80	120			

Sample ID: **CCV1-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 1:36:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.216	0.0300	0.200	0	108	90	110			
Calcium	4.60	0.300	5.00	0	92.0	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: 2005170
Project: A1 Area Landfill-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	

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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_200528A**

The QC data in batch 96513 applies to the following samples: 2005170-07A, 2005170-08A

Sample ID: **MB-96513** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:39:00 PM** Prep Date: **5/27/2020**

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-96513** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:41:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.198	0.00250	0.200	0	99.2	80	120			
Arsenic	0.208	0.00500	0.200	0	104	80	120			
Barium	0.201	0.0100	0.200	0	100	80	120			
Beryllium	0.201	0.00100	0.200	0	101	80	120			
Cadmium	0.204	0.00100	0.200	0	102	80	120			
Calcium	5.04	0.300	5.00	0	101	80	120			
Chromium	0.202	0.00500	0.200	0	101	80	120			
Cobalt	0.208	0.00500	0.200	0	104	80	120			
Lead	0.200	0.00100	0.200	0	100	80	120			
Lithium	0.203	0.0100	0.200	0	102	80	120			
Molybdenum	0.197	0.00500	0.200	0	98.7	80	120			
Selenium	0.212	0.00500	0.200	0	106	80	120			
Thallium	0.209	0.00150	0.200	0	104	80	120			

Sample ID: **LCSD-96513** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:43:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	100	80	120	0.944	15	
Arsenic	0.205	0.00500	0.200	0	103	80	120	1.23	15	
Barium	0.202	0.0100	0.200	0	101	80	120	0.602	15	
Beryllium	0.202	0.00100	0.200	0	101	80	120	0.251	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200528A

Sample ID: **LCSD-96513** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:43:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.205	0.00100	0.200	0	102	80	120	0.248	15	
Calcium	4.99	0.300	5.00	0	99.7	80	120	1.14	15	
Chromium	0.203	0.00500	0.200	0	102	80	120	0.622	15	
Cobalt	0.207	0.00500	0.200	0	103	80	120	0.666	15	
Lead	0.200	0.00100	0.200	0	100	80	120	0.055	15	
Lithium	0.205	0.0100	0.200	0	103	80	120	0.915	15	
Molybdenum	0.199	0.00500	0.200	0	99.5	80	120	0.772	15	
Selenium	0.210	0.00500	0.200	0	105	80	120	0.934	15	
Thallium	0.209	0.00150	0.200	0	104	80	120	0.064	15	

Sample ID: **2005196-06B SD** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:50:00 PM** Prep Date: **5/27/2020**

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	0.0401	0.0500	0	0.0405				1.19	20	
Beryllium	<0.00150	0.00500	0	0				0	20	
Cadmium	<0.00150	0.00500	0	0				0	20	
Calcium	172	1.50	0	171				0.754	20	
Chromium	<0.0100	0.0250	0	0				0	20	
Cobalt	<0.0150	0.0250	0	0				0	20	
Lead	<0.00150	0.00500	0	0				0	20	
Lithium	0.114	0.0500	0	0.112				1.67	20	
Molybdenum	<0.0100	0.0250	0	0				0	20	
Selenium	<0.0100	0.0250	0	0				0	20	
Thallium	<0.00250	0.00750	0	0				0	20	

Sample ID: **2005196-06B PDS** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 1:16:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.196	0.00250	0.200	0	97.8	75	125			
Arsenic	0.196	0.00500	0.200	0	98.0	75	125			
Barium	0.243	0.0100	0.200	0.0405	101	75	125			
Beryllium	0.199	0.00100	0.200	0	99.5	75	125			
Cadmium	0.198	0.00100	0.200	0	98.8	75	125			
Calcium	166	0.300	5.00	171	-97.0	75	125			S
Chromium	0.205	0.00500	0.200	0	102	75	125			
Cobalt	0.199	0.00500	0.200	0	99.4	75	125			
Lead	0.206	0.00100	0.200	0	103	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200528A

Sample ID: **2005196-06B PDS** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 1:16:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.311	0.0100	0.200	0.112	99.4	75	125			
Molybdenum	0.203	0.00500	0.200	0	102	75	125			
Selenium	0.186	0.00500	0.200	0	93.1	75	125			
Thallium	0.206	0.00150	0.200	0	103	75	125			

Sample ID: **2005196-06B MS** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 1:18:00 PM** Prep Date: **5/27/2020**

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	0.198	0.00500	0.200	0	98.9	75	125			
Barium	0.239	0.0100	0.200	0.0405	99.3	75	125			
Beryllium	0.201	0.00100	0.200	0	100	75	125			
Cadmium	0.194	0.00100	0.200	0	97.2	75	125			
Calcium	175	0.300	5.00	171	92.0	75	125			
Chromium	0.197	0.00500	0.200	0	98.5	75	125			
Cobalt	0.196	0.00500	0.200	0	97.8	75	125			
Lead	0.203	0.00100	0.200	0	101	75	125			
Lithium	0.318	0.0100	0.200	0.112	103	75	125			
Molybdenum	0.206	0.00500	0.200	0	103	75	125			
Selenium	0.190	0.00500	0.200	0	95.2	75	125			
Thallium	0.200	0.00150	0.200	0	100	75	125			

Sample ID: **2005196-06B MSD** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 1:20:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	99.9	75	125	0.662	15	
Arsenic	0.199	0.00500	0.200	0	99.3	75	125	0.440	15	
Barium	0.239	0.0100	0.200	0.0405	99.4	75	125	0.102	15	
Beryllium	0.199	0.00100	0.200	0	99.7	75	125	0.744	15	
Cadmium	0.194	0.00100	0.200	0	97.0	75	125	0.218	15	
Calcium	174	0.300	5.00	171	69.1	75	125	0.656	15	S
Chromium	0.197	0.00500	0.200	0	98.6	75	125	0.143	15	
Cobalt	0.196	0.00500	0.200	0	98.2	75	125	0.398	15	
Lead	0.203	0.00100	0.200	0	102	75	125	0.138	15	
Lithium	0.317	0.0100	0.200	0.112	102	75	125	0.526	15	
Molybdenum	0.205	0.00500	0.200	0	103	75	125	0.587	15	
Selenium	0.186	0.00500	0.200	0	93.1	75	125	2.23	15	
Thallium	0.209	0.00150	0.200	0	105	75	125	4.45	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200528A

Sample ID: **ICV-200528** Batch ID: **R110690** TestNo: **SW6020B** Units: **mg/L**
SampType: **ICV** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 11:00:00 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	0.101	0.00500	0.100	0	101	90	110			
Barium	0.103	0.0100	0.100	0	103	90	110			
Beryllium	0.102	0.00100	0.100	0	102	90	110			
Cadmium	0.105	0.00100	0.100	0	105	90	110			
Calcium	2.59	0.300	2.50	0	104	90	110			
Chromium	0.105	0.00500	0.100	0	105	90	110			
Cobalt	0.104	0.00500	0.100	0	104	90	110			
Lead	0.102	0.00100	0.100	0	102	90	110			
Lithium	0.104	0.0100	0.100	0	104	90	110			
Molybdenum	0.0978	0.00500	0.100	0	97.8	90	110			
Selenium	0.104	0.00500	0.100	0	104	90	110			
Thallium	0.0989	0.00150	0.100	0	98.9	90	110			

Sample ID: **LCVL-200528** Batch ID: **R110690** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 11:07:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00191	0.00250	0.00200	0	95.6	80	120			
Arsenic	0.00513	0.00500	0.00500	0	103	80	120			
Barium	0.00520	0.0100	0.00500	0	104	80	120			
Beryllium	0.000995	0.00100	0.00100	0	99.5	80	120			
Cadmium	0.000998	0.00100	0.00100	0	99.8	80	120			
Calcium	0.107	0.300	0.100	0	107	80	120			
Chromium	0.00525	0.00500	0.00500	0	105	80	120			
Cobalt	0.00519	0.00500	0.00500	0	104	80	120			
Lead	0.00101	0.00100	0.00100	0	101	80	120			
Lithium	0.0102	0.0100	0.0100	0	102	80	120			
Molybdenum	0.00512	0.00500	0.00500	0	102	80	120			
Selenium	0.00570	0.00500	0.00500	0	114	80	120			
Thallium	0.000978	0.00150	0.00100	0	97.8	80	120			

Sample ID: **CCV1-200528** Batch ID: **R110690** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 11:56:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.03	0.300	5.00	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200528A

Sample ID: **CCV2-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 12:23:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.206	0.00250	0.200	0	103	90	110			
Arsenic	0.209	0.00500	0.200	0	105	90	110			
Barium	0.210	0.0100	0.200	0	105	90	110			
Beryllium	0.209	0.00100	0.200	0	104	90	110			
Cadmium	0.215	0.00100	0.200	0	107	90	110			
Calcium	5.06	0.300	5.00	0	101	90	110			
Chromium	0.205	0.00500	0.200	0	103	90	110			
Cobalt	0.211	0.00500	0.200	0	106	90	110			
Lead	0.201	0.00100	0.200	0	100	90	110			
Lithium	0.212	0.0100	0.200	0	106	90	110			
Molybdenum	0.208	0.00500	0.200	0	104	90	110			
Selenium	0.213	0.00500	0.200	0	106	90	110			
Thallium	0.210	0.00150	0.200	0	105	90	110			

Sample ID: **CCV3-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 1:31:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	100	90	110			
Arsenic	0.209	0.00500	0.200	0	105	90	110			
Barium	0.203	0.0100	0.200	0	101	90	110			
Beryllium	0.204	0.00100	0.200	0	102	90	110			
Cadmium	0.207	0.00100	0.200	0	103	90	110			
Calcium	5.06	0.300	5.00	0	101	90	110			
Chromium	0.204	0.00500	0.200	0	102	90	110			
Cobalt	0.212	0.00500	0.200	0	106	90	110			
Lead	0.201	0.00100	0.200	0	100	90	110			
Lithium	0.205	0.0100	0.200	0	103	90	110			
Molybdenum	0.204	0.00500	0.200	0	102	90	110			
Selenium	0.214	0.00500	0.200	0	107	90	110			
Thallium	0.212	0.00150	0.200	0	106	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200519B

Sample ID: **DCS2-96406** Batch ID: **96406** TestNo: **E300** Units: **mg/L**
SampType: **DCS2** Run ID: **IC2_200519B** Analysis Date: **5/19/2020 11:56:12 AM** Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	0.440	1.00	0.5000	0	88.1	70	130	0	0	
Fluoride	0.176	0.400	0.2000	0	87.8	70	130	0	0	
Sulfate	1.69	3.00	1.500	0	113	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200526B

The QC data in batch 96496 applies to the following samples: 2005170-01B, 2005170-02B, 2005170-03B, 2005170-04B, 2005170-05B, 2005170-06B, 2005170-07B, 2005170-08B

Sample ID: **MB-96496** Batch ID: **96496** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_200526B** Analysis Date: **5/26/2020 11:00:09 AM** Prep Date: **5/26/2020**

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-96496** Batch ID: **96496** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_200526B** Analysis Date: **5/26/2020 11:16:09 AM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.56	1.00	10.00	0	95.6	90	110			
Fluoride	3.65	0.400	4.000	0	91.3	90	110			
Sulfate	29.0	3.00	30.00	0	96.5	90	110			

Sample ID: **LCSD-96496** Batch ID: **96496** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_200526B** Analysis Date: **5/26/2020 11:32:09 AM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.58	1.00	10.00	0	95.8	90	110	0.143	20	
Fluoride	3.65	0.400	4.000	0	91.3	90	110	0.026	20	
Sulfate	29.0	3.00	30.00	0	96.6	90	110	0.048	20	

Sample ID: **2005191-01CMS** Batch ID: **96496** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_200526B** Analysis Date: **5/27/2020 12:18:11 AM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	20.1	1.00	20.00	1.583	92.7	90	110			
Fluoride	20.0	0.400	20.00	0.1673	99.3	90	110			
Sulfate	19.5	3.00	20.00	1.523	89.7	90	110			

Sample ID: **2005191-01CMSD** Batch ID: **96496** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_200526B** Analysis Date: **5/27/2020 12:34:11 AM** Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	20.3	1.00	20.00	1.583	93.4	90	110	0.762	20	
Fluoride	20.2	0.400	20.00	0.1673	100	90	110	1.02	20	
Sulfate	19.6	3.00	20.00	1.523	90.3	90	110	0.562	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200526B

Sample ID: **2005191-02CMS**	Batch ID: **96496**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_200526B**	Analysis Date: **5/27/2020 1:06:11 AM**	Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	22.5	1.00	20.00	2.981	97.5	90	110			
Fluoride	20.2	0.400	20.00	0	101	90	110			
Sulfate	19.3	3.00	20.00	0	96.3	90	110			

Sample ID: **2005191-02CMSD**	Batch ID: **96496**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_200526B**	Analysis Date: **5/27/2020 1:22:11 AM**	Prep Date: **5/26/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	22.4	1.00	20.00	2.981	97.3	90	110	0.204	20	
Fluoride	20.2	0.400	20.00	0	101	90	110	0.224	20	
Sulfate	19.2	3.00	20.00	0	96.2	90	110	0.074	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200526B

Sample ID: **ICV-200526**	Batch ID: **R110647**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_200526B**	Analysis Date: **5/26/2020 10:28:09 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.5	1.00	25.00	0	97.9	90	110			
Fluoride	9.54	0.400	10.00	0	95.4	90	110			
Sulfate	75.5	3.00	75.00	0	101	90	110			

Sample ID: **CCV1-200526**	Batch ID: **R110647**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200526B**	Analysis Date: **5/26/2020 5:38:12 PM**	Prep Date:

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	3.83	0.400	4.000	0	95.9	90	110			
Sulfate	29.8	3.00	30.00	0	99.3	90	110			

Sample ID: **CCV2-200526**	Batch ID: **R110647**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200526B**	Analysis Date: **5/26/2020 9:38:11 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.77	1.00	10.00	0	97.7	90	110			
Fluoride	3.72	0.400	4.000	0	93.1	90	110			
Sulfate	29.3	3.00	30.00	0	97.5	90	110			

Sample ID: **CCV3-200526**	Batch ID: **R110647**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200526B**	Analysis Date: **5/27/2020 2:42:11 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.87	1.00	10.00	0	98.7	90	110			
Fluoride	3.80	0.400	4.000	0	95.1	90	110			
Sulfate	29.5	3.00	30.00	0	98.3	90	110			

Sample ID: **CCV4-200526**	Batch ID: **R110647**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200526B**	Analysis Date: **5/27/2020 6:10:11 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.92	1.00	10.00	0	99.2	90	110			
Fluoride	3.77	0.400	4.000	0	94.3	90	110			
Sulfate	29.7	3.00	30.00	0	98.9	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: 2005170
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_200521B

The QC data in batch 96451 applies to the following samples: 2005170-01B, 2005170-02B, 2005170-03B, 2005170-04B, 2005170-05B, 2005170-06B, 2005170-07B, 2005170-08B

Sample ID: **MB-96451** Batch ID: **96451** TestNo: **M2540C** Units: **mg/L**
SampType: **MBLK** Run ID: **WC_200521B** Analysis Date: **5/21/2020 4:50:00 PM** Prep Date: **5/21/2020**

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-96451** Batch ID: **96451** TestNo: **M2540C** Units: **mg/L**
SampType: **LCS** Run ID: **WC_200521B** Analysis Date: **5/21/2020 4:50:00 PM** Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	756	10.0	745.6	0	101	90	113			

Sample ID: **2005144-02D-DUP** Batch ID: **96451** TestNo: **M2540C** Units: **mg/L**
SampType: **DUP** Run ID: **WC_200521B** Analysis Date: **5/21/2020 4:50:00 PM** Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3510	50.0	0	3565				1.55	5	

Sample ID: **2005145-01D-DUP** Batch ID: **96451** TestNo: **M2540C** Units: **mg/L**
SampType: **DUP** Run ID: **WC_200521B** Analysis Date: **5/21/2020 4:50:00 PM** Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3240	50.0	0	3230				0.309	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: 2005170
Project: A1 Area Landfill-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 24, 2020

DHL Analytical, Inc.

Sample Delivery Group:	L1222911
Samples Received:	05/28/2020
Project Number:	2005170
Description:	

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

Entire Report Reviewed By:

Jason Romer
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 Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



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BMW-24 L1222911-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/20/20 10:25	05/28/20 10:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1484279	1	06/02/20 13:54	06/16/20 14:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN

BMW-23 L1222911-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/20/20 11:15	05/28/20 10:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1484279	1	06/02/20 13:54	06/16/20 14:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN

BMW-20 L1222911-03 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/20/20 12:10	05/28/20 10:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1484279	1	06/02/20 13:54	06/16/20 14:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN

BMW-21 L1222911-04 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/20/20 13:00	05/28/20 10:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1484279	1	06/02/20 13:54	06/16/20 14:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN

BMW-26 L1222911-05 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/20/20 14:05	05/28/20 10:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1484279	1	06/02/20 13:54	06/16/20 14:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN

BMW-27 L1222911-06 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/20/20 15:00	05/28/20 10:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1484279	1	06/02/20 13:54	06/16/20 14:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN

BMW-19 L1222911-07 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/20/20 16:20	05/28/20 10:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1484279	1	06/02/20 13:54	06/16/20 14:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1492712	1	06/15/20 14:42	06/16/20 14:41	RGT	Mt. Juliet, TN

BMW-22 L1222911-08 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/20/20 17:20	05/28/20 10:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1484279	1	06/02/20 13:54	06/16/20 14:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1492712	1	06/15/20 14:42	06/16/20 18:47	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1492712	1	06/15/20 14:42	06/16/20 18:47	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.



Jason Romer
Project Manager

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	2.45		0.625	1.1	06/16/2020 14:10	WG1484279
(T) Barium	*80.4*			*62.0-143*	*06/16/2020 14:10*	WG1484279
(T) Yttrium	*103*			*79.0-136*	*06/16/2020 14:10*	WG1484279

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	2.99		0.935	1.35	06/16/2020 14:41	WG1492712

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.532		0.310	0.249	06/16/2020 14:41	WG1492712
(T) Barium-133	*91.0*			*30.0-143*	*06/16/2020 14:41*	WG1492712

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	2.27		0.644	1.08	06/16/2020 14:10	WG1484279
(T) Barium	*88.7*			*62.0-143*	*06/16/2020 14:10*	WG1484279
(T) Yttrium	*95.5*			*79.0-136*	*06/16/2020 14:10*	WG1484279

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	2.93		0.992	1.36	06/16/2020 14:41	WG1492712

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.669		0.348	0.276	06/16/2020 14:41	WG1492712
(T) Barium-133	*93.3*			*30.0-143*	*06/16/2020 14:41*	WG1492712

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	2.15		0.639	1.13	06/16/2020 14:10	WG1484279
(T) Barium	*86.7*			*62.0-143*	*06/16/2020 14:10*	WG1484279
(T) Yttrium	*104*			*79.0-136*	*06/16/2020 14:10*	WG1484279

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	2.65		0.913	1.35	06/16/2020 14:41	WG1492712

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.500		0.274	0.219	06/16/2020 14:41	WG1492712
(T) Barium-133	*102*			*30.0-143*	*06/16/2020 14:41*	WG1492712

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	1.76		0.560	0.984	06/16/2020 14:10	WG1484279
(T) Barium	*91.2*			*62.0-143*	*06/16/2020 14:10*	WG1484279
(T) Yttrium	*107*			*79.0-136*	*06/16/2020 14:10*	WG1484279

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	2.32		0.888	1.25	06/16/2020 14:41	WG1492712

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.562		0.328	0.263	06/16/2020 14:41	WG1492712
(T) Barium-133	*91.2*			*30.0-143*	*06/16/2020 14:41*	WG1492712

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.696		0.587	0.846	06/16/2020 14:10	WG1484279
(T) Barium	*102*			*62.0-143*	*06/16/2020 14:10*	WG1484279
(T) Yttrium	*103*			*79.0-136*	*06/16/2020 14:10*	WG1484279

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.853		0.789	1.13	06/16/2020 14:41	WG1492712

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.158		0.202	0.288	06/16/2020 14:41	WG1492712
(T) Barium-133	*99.8*			*30.0-143*	*06/16/2020 14:41*	WG1492712

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.255		0.589	0.856	06/16/2020 14:10	WG1484279
(T) Barium	*99.9*			*62.0-143*	*06/16/2020 14:10*	WG1484279
(T) Yttrium	*109*			*79.0-136*	*06/16/2020 14:10*	WG1484279

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.520		0.803	1.09	06/16/2020 14:41	WG1492712

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.265		0.214	0.229	06/16/2020 14:41	WG1492712
(T) Barium-133	*101*			*30.0-143*	*06/16/2020 14:41*	WG1492712

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.127		0.512	0.749	06/16/2020 14:10	WG1484279
(T) Barium	*107*			*62.0-143*	*06/16/2020 14:10*	WG1484279
(T) Yttrium	*104*			*79.0-136*	*06/16/2020 14:10*	WG1484279

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.192		0.640	0.964	06/16/2020 14:41	WG1492712

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.0651		0.128	0.215	06/16/2020 14:41	WG1492712
(T) Barium-133	*101*			*30.0-143*	*06/16/2020 14:41*	WG1492712

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	2.67		0.562	0.865	06/16/2020 14:10	WG1484279
(T) Barium	*91.3*			*62.0-143*	*06/16/2020 14:10*	WG1484279
(T) Yttrium	*104*			*79.0-136*	*06/16/2020 14:10*	WG1484279

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	3.58		0.954	1.16	06/16/2020 18:47	WG1492712

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.909		0.392	0.293	06/16/2020 18:47	WG1492712
(T) Barium-133	*93.6*			*30.0-143*	*06/16/2020 18:47*	WG1492712

Method Blank (MB)

(MB) R3540497-1 06/16/20 09:40

Analyte	MB Result	MB Qualifier	MB MDA
	pCi/l		pCi/l
Radium-228	0.442		0.422
(T) Barium	*97.2*		
(T) Yttrium	*105*		

L1222881-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1222881-01 06/16/20 09:40 • (DUP) R3540497-5 06/16/20 09:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	pCi/l		%			%	
Radium-228	0.394	0.886	1	76.9	0.543		20	3
(T) Barium	*82.7*	*86.8*						
(T) Yttrium	*97.9*	*104*						

Laboratory Control Sample (LCS)

(LCS) R3540497-2 06/16/20 09:40

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-228	5.00	4.72	94.4	80.0-120	
(T) Barium			*83.3*		
(T) Yttrium			*97.0*		

L1221007-29 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1221007-29 06/16/20 09:40 • (MS) R3540497-3 06/16/20 09:40 • (MSD) R3540497-4 06/16/20 09:40

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	0.167	9.78	9.56	96.1	93.9	1	70.0-130			2.21		20
(T) Barium		*98.7*			*90.3*	*96.7*							
(T) Yttrium		*99.4*			*99.2*	*98.4*							

Method Blank (MB)

(MB) R3541294-1 06/16/20 14:55

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-226	0.0134		0.0555
(T) Barium-133	*87.1*		

L1222911-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1222911-04 06/16/20 14:41 • (DUP) R3541294-5 06/16/20 14:55

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.562	0.340	1	49.4	0.521		20	3
(T) Barium-133	*91.2*	*94.7*						

Laboratory Control Sample (LCS)

(LCS) R3541294-2 06/16/20 14:55

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.02	5.23	104	80.0-120	
(T) Barium-133			*86.4*		

L1221461-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1221461-09 06/16/20 14:41 • (MS) R3541294-3 06/16/20 14:55 • (MSD) R3541294-4 06/16/20 14:55

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-226	20.1	0.0610	22.2	21.4	110	106	1	75.0-125			3.85		20
(T) Barium-133		*86.6*			*90.5*	*92.2*							

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

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

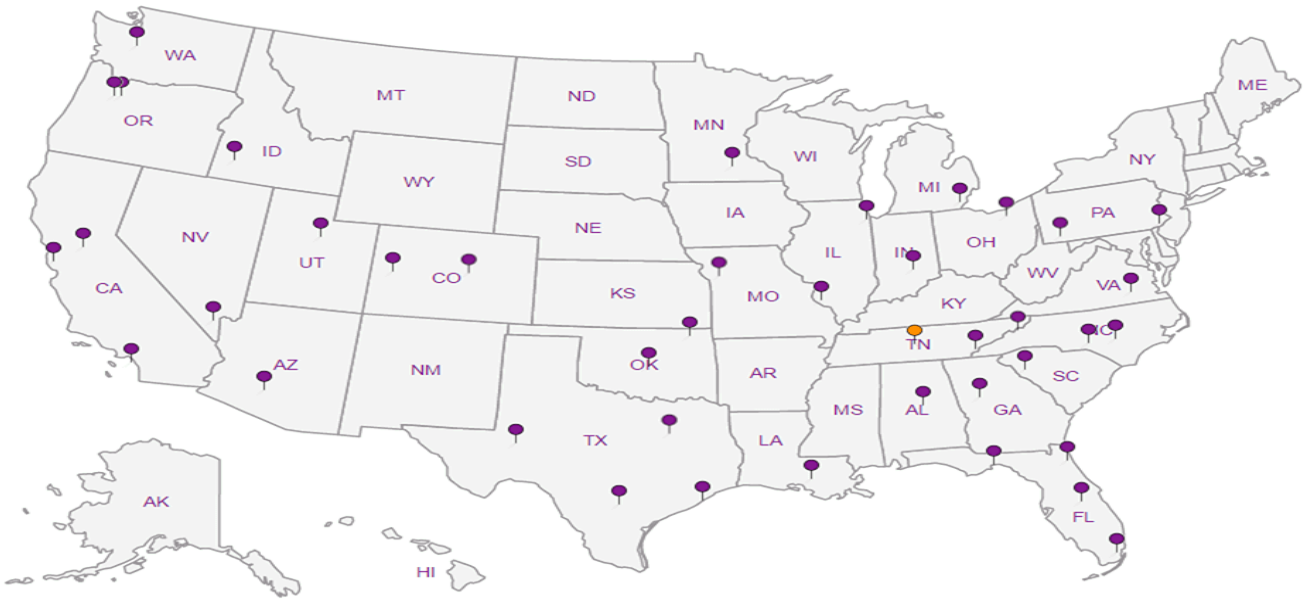
Third Party Federal Accreditations

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

G165

Work Order: 2005170

122294

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

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

21-May-20

Sample ID	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests					
					Ra-228	Ra-226				
					E904.0	M7500 Ra B M				
BMW-24	Aqueous	01C	05/20/20 10:25 AM	1LHDPEHNO3	1					01
BMW-24	Aqueous	01D	05/20/20 10:25 AM	1LHDPEHNO3		1				
BMW-23	Aqueous	02C	05/20/20 11:15 AM	1LHDPEHNO3	1					02
BMW-23	Aqueous	02D	05/20/20 11:15 AM	1LHDPEHNO3		1				
BMW-20	Aqueous	03C	05/20/20 12:10 PM	1LHDPEHNO3	1					03
BMW-20	Aqueous	03D	05/20/20 12:10 PM	1LHDPEHNO3		1				
BMW-21	Aqueous	04C	05/20/20 01:00 PM	1LHDPEHNO3	1					04
BMW-21	Aqueous	04D	05/20/20 01:00 PM	1LHDPEHNO3		1				
BMW-26	Aqueous	05C	05/20/20 02:05 PM	1LHDPEHNO3	1					05
BMW-26	Aqueous	05D	05/20/20 02:05 PM	1LHDPEHNO3		1				
BMW-27	Aqueous	06C	05/20/20 03:00 PM	1LHDPEHNO3	1					06
BMW-27	Aqueous	06D	05/20/20 03:00 PM	1LHDPEHNO3		1				
BMW-19	Aqueous	07C	05/20/20 04:20 PM	1LHDPEHNO3	1					07
BMW-19	Aqueous	07D	05/20/20 04:20 PM	1LHDPEHNO3		1				
BMW-22	Aqueous	08C	05/20/20 05:20 PM	1LHDPEHNO3	1					08
BMW-22	Aqueous	08D	05/20/20 05:20 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

Amb

		Date/Time			Date/Time
Relinquished by:		5/26/20 1700	Received by:	Carol Kemp	5/28/20 10:15
Relinquished by:			Received by:		

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: DHLRRTX	1722911	
Cooler Received/Opened On: 5/28/20 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 02, 2020

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

Order No.: 2005173

RE: A1 Area Landfill-MNA

Dear Will Vienne:

DHL Analytical, Inc. received 8 sample(s) on 5/21/2020 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

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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

№ 68313

CHAIN-OF-CUSTODY

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

DATE: 5-20-20 PAGE 1 OF 1
PO #: 19134019 DHL WORK ORDER #: 2005173
PROJECT LOCATION OR NAME: AI AREA LANDFILL - 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

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 X COD ❑ | 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

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ❑ NaOH ❑	ICE	UNPRESERVED	ANALYSES	NO_3 + PO_4 + Na + Mg + K	Ferrous Fe + Ferric Fe	FIELD NOTES
BMW-24	01	5-20-20	1025	W		S		X		X		X	X	X	
BMW-23	02		1115	W		S		X		X		X	X	X	
BMW-20	03		1210	W		S		X		X		X	X	X	
BMW-21	04		1300	W		S		X		X		X	X	X	
BMW-26	05		1405	W		S		X		X		X	X	X	
BMW-27	06		1500	W		S		X		X		X	X	X	
BMW-19	07		1620	W		S		X		X		X	X	X	
BMW-22	08		1720	W		S		X		X		X	X	X	

RELINQUISHED BY: (Signature) DATE/TIME 5-20-20 1830 RECEIVED BY: (Signature) FedEx
RELINQUISHED BY: (Signature) FedEx DATE/TIME 5.21.20 0901 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: 3.4/4.3/4.2/4.0 THERM #: 78
CUSTODY SEALS: ❑ BROKEN ☒ INTACT ❑ NOT USED
CARRIER: ❑ LONE STAR ☒ FEDEX ❑ UPS ❑ OTHER
❑ COURIER DELIVERY
❑ HAND DELIVERED

DHL COC Rev 1 | FEB 2010



ORIGIN ID:GGGA (512) 671-3434
J. BRAYTON
GOLDER
2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 20MAY20
ACTWGT: 50.80 LB
CAD: 6994167/SSFE2110
DIMS: 24x14x14 IN

BILL THIRD PARTY

Part # 156297-435 RRDB2 EXP 01/21

TO DHL ANALYTICAL
DHL ANALYTICAL
2300 DOUBLE CREEK DR

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

FedEx Express

1 of 4
TRK# 0201 3930 6200 6609
MASTER
A8 BSMA

THU - 21 MAY 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

3.4

501

CUSTODY SEAL

DATE 5-20-20

SIGNATURE

DHL ANALYTICAL

Golder



ORIGIN ID:GGGA (512) 671-3434
J. BRAYTON
GOLDER
2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 20MAY20
ACTWGT: 44.05 LB
CAD: 6994167/SSFE2110
DIMS: 25x14x14 IN

BILL THIRD PARTY

Part # 156297-435 RRDB2 EXP 01/21

TO DHL ANALYTICAL
DHL ANALYTICAL
2300 DOUBLE CREEK DR

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

FedEx Express

2 of 4
MPS# 0263 3930 6200 6610
Mstr# 3930 6200 6609 0201

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A8 BSMA

4.3

512

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ORIGIN ID:GGGA (512) 671-3404
J. BRAYTON
GOLDER
2201 DOUBLE CREEK DR STE 404
ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 20MAY20
ACTWGT: 53.60 LB
CAD: 6984167/SSFE2710
DIMS: 21x14x14 IN

BILL THIRD PARTY

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DHL ANALYTICAL
2300 DOUBLE CREEK DR

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

FedEx Express

3 of 4
MPS# 0263 3930 6200 6620
Mstr# 3930 6200 6609

THU - 21 MAY 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

A8 BSMA

4.2

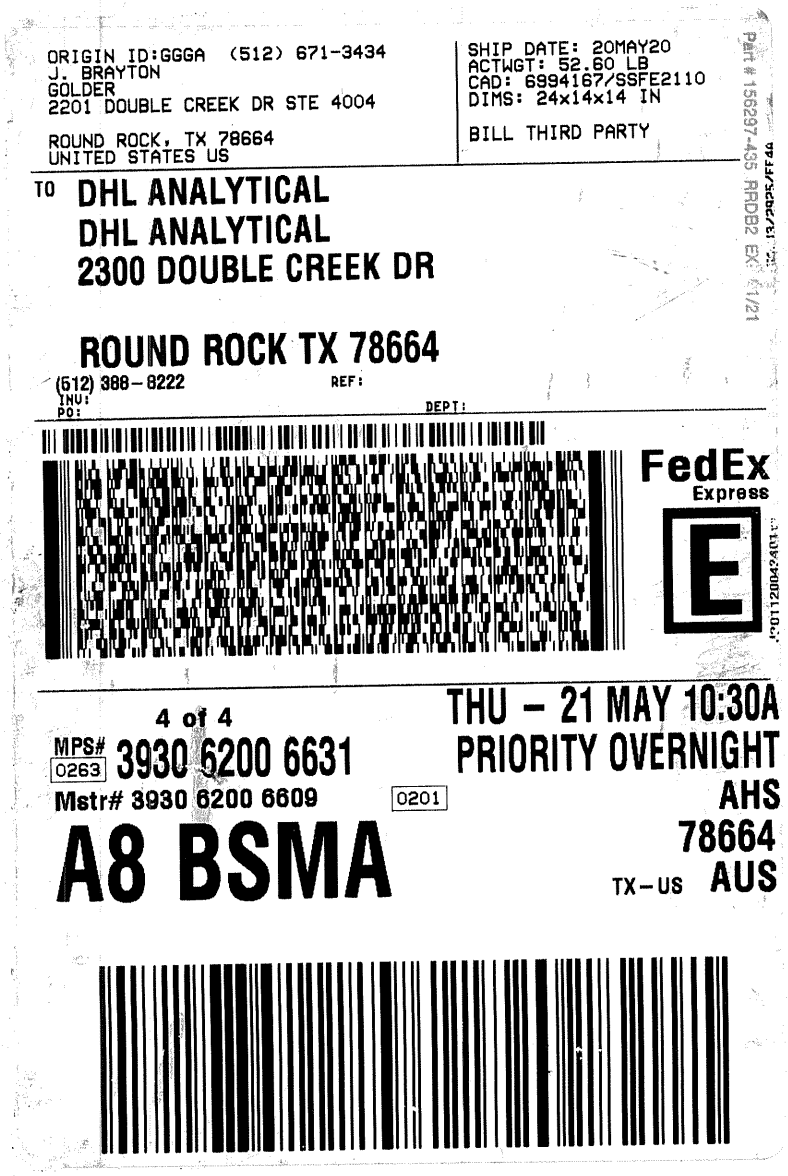
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DATE 5-20-20

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ORIGIN ID:GGGA (512) 671-3434
J. BRAYTON
GOLDER
2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 20MAY20
ACTWGT: 52.60 LB
CAD: 6994167/SSFE2110
DIMS: 24x14x14 IN

BILL THIRD PARTY

TO DHL ANALYTICAL
DHL ANALYTICAL
2300 DOUBLE CREEK DR

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

FedEx Express

4 of 4
MPS# 0263 3930 6200 6631
Mstr# 3930 6200 6609 0201

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A8 BSMA

4.0

692

CUSTODY SEAL

DATE 5-20-20

SIGNATURE

DHL ANALYTICAL

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Golder** Date Received: **5/21/2020**

Work Order Number **2005173** Received by: **JH**

Checklist completed by: _____ 5/21/2020 Reviewed by _____ 5/21/2020
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 ☐	**3.4** °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: A1 Area Landfill-MNA	**LRC Date:** 6/2/2020
Reviewer Name: Angie O'Donnell	**Laboratory Work Order: 2005173**
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: A1 Area Landfill-MNA	**LRC Date:** 6/2/2020
Reviewer Name: Angie O'Donnell	**Laboratory Work Order: 2005173**
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

06/03/20

Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *03-Jun-20*

CLIENT: Golder
Project: A1 Area Landfill-MNA
Lab Order: 2005173

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 - Ferric Iron Analysis (The calculation is not NELAP Certified)
Method M4500-P E - Orthophosphate Analysis

Exception Report R1-01

The samples were received and log-in performed on 5/21/2020. A total of 8 samples were received and analyzed. The samples arrived in good condition and were properly packaged.

Exception Report R7-03

For Metals Analysis, the recoveries of up to two analytes for the Matrix Spike and Matrix Spike Duplicate (2005196-06 MS/MSD) were above the method control limits. These are flagged accordingly in the QC Summary Report. These analytes were 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.

DHL Analytical, Inc.

Date: *02-Jun-20*

CLIENT: Golder
Project: A1 Area Landfill-MNA
Lab Order: 2005173

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2005173-01	BMW-24		05/20/20 10:25 AM	5/21/2020
2005173-02	BMW-23		05/20/20 11:15 AM	5/21/2020
2005173-03	BMW-20		05/20/20 12:10 PM	5/21/2020
2005173-04	BMW-21		05/20/20 01:00 PM	5/21/2020
2005173-05	BMW-26		05/20/20 02:05 PM	5/21/2020
2005173-06	BMW-27		05/20/20 03:00 PM	5/21/2020
2005173-07	BMW-19		05/20/20 04:20 PM	5/21/2020
2005173-08	BMW-22		05/20/20 05:20 PM	5/21/2020

Lab Order: 2005173
Client: Golder
Project: A1 Area Landfill-MNA

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005173-01A	BMW-24	05/20/20 10:25 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
	BMW-24	05/20/20 10:25 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005173-01B	BMW-24	05/20/20 10:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-24	05/20/20 10:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005173-01C	BMW-24	05/20/20 10:25 AM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-24	05/20/20 10:25 AM	Aqueous	E300	Anion Preparation	05/21/20 09:05 AM	96436
	BMW-24	05/20/20 10:25 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/21/20 02:34 PM	96457
2005173-02A	BMW-23	05/20/20 11:15 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
	BMW-23	05/20/20 11:15 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005173-02B	BMW-23	05/20/20 11:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-23	05/20/20 11:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005173-02C	BMW-23	05/20/20 11:15 AM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-23	05/20/20 11:15 AM	Aqueous	E300	Anion Preparation	05/21/20 09:05 AM	96436
	BMW-23	05/20/20 11:15 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/21/20 02:34 PM	96457
2005173-03A	BMW-20	05/20/20 12:10 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
	BMW-20	05/20/20 12:10 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005173-03B	BMW-20	05/20/20 12:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-20	05/20/20 12:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005173-03C	BMW-20	05/20/20 12:10 PM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-20	05/20/20 12:10 PM	Aqueous	E300	Anion Preparation	05/21/20 09:05 AM	96436
	BMW-20	05/20/20 12:10 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/21/20 02:34 PM	96457
2005173-04A	BMW-21	05/20/20 01:00 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005173-04B	BMW-21	05/20/20 01:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-21	05/20/20 01:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005173-04C	BMW-21	05/20/20 01:00 PM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-21	05/20/20 01:00 PM	Aqueous	E300	Anion Preparation	05/21/20 09:05 AM	96436
	BMW-21	05/20/20 01:00 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/21/20 02:34 PM	96457
2005173-05A	BMW-26	05/20/20 02:05 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483

Lab Order: 2005173
Client: Golder
Project: A1 Area Landfill-MNA

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005173-05B	BMW-26	05/20/20 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-26	05/20/20 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005173-05C	BMW-26	05/20/20 02:05 PM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-26	05/20/20 02:05 PM	Aqueous	E300	Anion Preparation	05/21/20 09:05 AM	96436
	BMW-26	05/20/20 02:05 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/21/20 02:34 PM	96457
2005173-06A	BMW-27	05/20/20 03:00 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005173-06B	BMW-27	05/20/20 03:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-27	05/20/20 03:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005173-06C	BMW-27	05/20/20 03:00 PM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-27	05/20/20 03:00 PM	Aqueous	E300	Anion Preparation	05/21/20 09:05 AM	96436
	BMW-27	05/20/20 03:00 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/21/20 02:34 PM	96457
2005173-07A	BMW-19	05/20/20 04:20 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005173-07B	BMW-19	05/20/20 04:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-19	05/20/20 04:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005173-07C	BMW-19	05/20/20 04:20 PM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-19	05/20/20 04:20 PM	Aqueous	E300	Anion Preparation	05/21/20 09:05 AM	96436
	BMW-19	05/20/20 04:20 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/21/20 02:34 PM	96457
2005173-08A	BMW-22	05/20/20 05:20 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
	BMW-22	05/20/20 05:20 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005173-08B	BMW-22	05/20/20 05:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-22	05/20/20 05:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005173-08C	BMW-22	05/20/20 05:20 PM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-22	05/20/20 05:20 PM	Aqueous	E300	Anion Preparation	05/21/20 09:05 AM	96436
	BMW-22	05/20/20 05:20 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/21/20 02:34 PM	96457

Lab Order: 2005173
Client: Golder
Project: A1 Area Landfill-MNA

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005173-01A	BMW-24	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-24	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:42 PM	UV/VIS_2_200522C
	BMW-24	Aqueous	M3500-Fe D	Ferrous Iron	96483	50	05/22/20 04:59 PM	UV/VIS_2_200522C
2005173-01B	BMW-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	10	05/29/20 01:08 PM	ICP-MS4_200529A
	BMW-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 12:56 PM	ICP-MS5_200528A
2005173-01C	BMW-24	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 01:33 PM	TITRATOR_200601B
	BMW-24	Aqueous	E300	Anions by IC method - Water	96436	1	05/21/20 03:00 PM	IC4_200521A
	BMW-24	Aqueous	M4500-P E	Orthophosphate	96457	1	05/21/20 03:25 PM	UV/VIS_2_200521C
2005173-02A	BMW-23	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-23	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:43 PM	UV/VIS_2_200522C
	BMW-23	Aqueous	M3500-Fe D	Ferrous Iron	96483	50	05/22/20 04:59 PM	UV/VIS_2_200522C
2005173-02B	BMW-23	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	50	05/29/20 01:10 PM	ICP-MS4_200529A
	BMW-23	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 12:58 PM	ICP-MS5_200528A
2005173-02C	BMW-23	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 02:11 PM	TITRATOR_200601B
	BMW-23	Aqueous	E300	Anions by IC method - Water	96436	1	05/21/20 03:16 PM	IC4_200521A
	BMW-23	Aqueous	M4500-P E	Orthophosphate	96457	1	05/21/20 03:26 PM	UV/VIS_2_200521C
2005173-03A	BMW-20	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-20	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:43 PM	UV/VIS_2_200522C
	BMW-20	Aqueous	M3500-Fe D	Ferrous Iron	96483	200	05/22/20 05:07 PM	UV/VIS_2_200522C
2005173-03B	BMW-20	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	20	05/29/20 01:12 PM	ICP-MS4_200529A
	BMW-20	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:00 PM	ICP-MS5_200528A
2005173-03C	BMW-20	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 02:28 PM	TITRATOR_200601B
	BMW-20	Aqueous	E300	Anions by IC method - Water	96436	1	05/21/20 03:32 PM	IC4_200521A
	BMW-20	Aqueous	M4500-P E	Orthophosphate	96457	1	05/21/20 03:26 PM	UV/VIS_2_200521C
2005173-04A	BMW-21	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-21	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:44 PM	UV/VIS_2_200522C
2005173-04B	BMW-21	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	50	05/29/20 01:14 PM	ICP-MS4_200529A
	BMW-21	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:03 PM	ICP-MS5_200528A

Lab Order: 2005173
Client: Golder
Project: A1 Area Landfill-MNA

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005173-04C	BMW-21	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 02:59 PM	TITRATOR_200601B
	BMW-21	Aqueous	E300	Anions by IC method - Water	96436	1	05/21/20 03:48 PM	IC4_200521A
	BMW-21	Aqueous	M4500-P E	Orthophosphate	96457	1	05/21/20 03:26 PM	UV/VIS_2_200521C
2005173-05A	BMW-26	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-26	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:44 PM	UV/VIS_2_200522C
2005173-05B	BMW-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	20	05/29/20 01:16 PM	ICP-MS4_200529A
	BMW-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:05 PM	ICP-MS5_200528A
2005173-05C	BMW-26	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 03:33 PM	TITRATOR_200601B
	BMW-26	Aqueous	E300	Anions by IC method - Water	96436	1	05/21/20 04:04 PM	IC4_200521A
	BMW-26	Aqueous	M4500-P E	Orthophosphate	96457	1	05/21/20 03:27 PM	UV/VIS_2_200521C
2005173-06A	BMW-27	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-27	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:44 PM	UV/VIS_2_200522C
2005173-06B	BMW-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	20	05/29/20 02:50 PM	ICP-MS4_200529A
	BMW-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:07 PM	ICP-MS5_200528A
2005173-06C	BMW-27	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 04:04 PM	TITRATOR_200601B
	BMW-27	Aqueous	E300	Anions by IC method - Water	96436	1	05/21/20 04:20 PM	IC4_200521A
	BMW-27	Aqueous	M4500-P E	Orthophosphate	96457	1	05/21/20 03:27 PM	UV/VIS_2_200521C
2005173-07A	BMW-19	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-19	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:44 PM	UV/VIS_2_200522C
2005173-07B	BMW-19	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	20	05/29/20 01:48 PM	ICP-MS4_200529A
	BMW-19	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:09 PM	ICP-MS5_200528A
2005173-07C	BMW-19	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 04:24 PM	TITRATOR_200601B
	BMW-19	Aqueous	E300	Anions by IC method - Water	96436	1	05/21/20 04:36 PM	IC4_200521A
	BMW-19	Aqueous	M4500-P E	Orthophosphate	96457	1	05/21/20 03:27 PM	UV/VIS_2_200521C
2005173-08A	BMW-22	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-22	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:45 PM	UV/VIS_2_200522C
	BMW-22	Aqueous	M3500-Fe D	Ferrous Iron	96483	20	05/22/20 05:05 PM	UV/VIS_2_200522C
2005173-08B	BMW-22	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	20	05/29/20 01:50 PM	ICP-MS4_200529A

Lab Order: 2005173
Client: Golder
Project: A1 Area Landfill-MNA

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005173-08B	BMW-22	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:36 PM	ICP-MS5_200528A
2005173-08C	BMW-22	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 04:45 PM	TITRATOR_200601B
	BMW-22	Aqueous	E300	Anions by IC method - Water	96436	1	05/21/20 04:52 PM	IC4_200521A
	BMW-22	Aqueous	M4500-P E	Orthophosphate	96457	1	05/21/20 03:28 PM	UV/VIS_2_200521C

DHL Analytical, Inc.

Date: *02-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-24
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005173-01
Project No:	19134019-3000	**Collection Date:**	05/20/20 10:25 AM
Lab Order:	2005173	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	25.4	0.300	1.00		mg/L	10	05/29/20 01:08 PM
Magnesium	62.4	1.00	3.00		mg/L	10	05/29/20 01:08 PM
Potassium	2.89	0.100	0.300		mg/L	1	05/28/20 12:56 PM
Sodium	131	1.00	3.00		mg/L	10	05/29/20 01:08 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/21/20 03:00 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	196	10.0	20.0		mg/L @ pH 4.52	1	06/01/20 01:33 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	06/01/20 01:33 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	06/01/20 01:33 PM
Alkalinity, Total (As CaCO3)	196	20.0	20.0		mg/L @ pH 4.52	1	06/01/20 01:33 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	12.4	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	13.0	2.50	5.00	N	mg/L	50	05/22/20 04:59 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/21/20 03:25 PM

Qualifiers:

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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: *02-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-23
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005173-02
Project No:	19134019-3000	**Collection Date:**	05/20/20 11:15 AM
Lab Order:	2005173	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	8.94	0.0300	0.100		mg/L	1	05/28/20 12:58 PM
Magnesium	94.9	5.00	15.0		mg/L	50	05/29/20 01:10 PM
Potassium	4.31	0.100	0.300		mg/L	1	05/28/20 12:58 PM
Sodium	312	5.00	15.0		mg/L	50	05/29/20 01:10 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/21/20 03:16 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	501	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 02:11 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 02:11 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 02:11 PM
Alkalinity, Total (As CaCO3)	501	20.0	20.0		mg/L @ pH 4.53	1	06/01/20 02:11 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	3.05	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	5.89	2.50	5.00	N	mg/L	50	05/22/20 04:59 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/21/20 03:26 PM

Qualifiers:

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DF- Dilution Factor
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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: *02-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-20
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005173-03
Project No:	19134019-3000	**Collection Date:**	05/20/20 12:10 PM
Lab Order:	2005173	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	81.4	0.600	2.00		mg/L	20	05/29/20 01:12 PM
Magnesium	123	2.00	6.00		mg/L	20	05/29/20 01:12 PM
Potassium	7.83	0.100	0.300		mg/L	1	05/28/20 01:00 PM
Sodium	61.2	2.00	6.00		mg/L	20	05/29/20 01:12 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/21/20 03:32 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	234	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 02:28 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 02:28 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 02:28 PM
Alkalinity, Total (As CaCO3)	234	20.0	20.0		mg/L @ pH 4.53	1	06/01/20 02:28 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	19.9	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	61.5	10.0	20.0	N	mg/L	200	05/22/20 05:07 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/21/20 03:26 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: *02-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-21
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005173-04
Project No:	19134019-3000	**Collection Date:**	05/20/20 01:00 PM
Lab Order:	2005173	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	1.01	0.0300	0.100		mg/L	1	05/28/20 01:03 PM
Magnesium	139	5.00	15.0		mg/L	50	05/29/20 01:14 PM
Potassium	5.09	0.100	0.300		mg/L	1	05/28/20 01:03 PM
Sodium	380	5.00	15.0		mg/L	50	05/29/20 01:14 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/21/20 03:48 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	761	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 02:59 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 02:59 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 02:59 PM
Alkalinity, Total (As CaCO3)	761	20.0	20.0		mg/L @ pH 4.54	1	06/01/20 02:59 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	1.01	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:44 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.0300	0.0300	0.100	J	mg/L	1	05/21/20 03:26 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
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DHL Analytical, Inc.

Date: *02-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-26
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005173-05
Project No:	19134019-3000	**Collection Date:**	05/20/20 02:05 PM
Lab Order:	2005173	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	0.110	0.0300	0.100		mg/L	1	05/28/20 01:05 PM
Magnesium	133	2.00	6.00		mg/L	20	05/29/20 01:16 PM
Potassium	12.9	0.100	0.300		mg/L	1	05/28/20 01:05 PM
Sodium	268	2.00	6.00		mg/L	20	05/29/20 01:16 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/21/20 04:04 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	852	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 03:33 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 03:33 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 03:33 PM
Alkalinity, Total (As CaCO3)	852	20.0	20.0		mg/L @ pH 4.54	1	06/01/20 03:33 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.110	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:44 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/21/20 03:27 PM

Qualifiers:

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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: *02-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-27
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005173-06
Project No:	19134019-3000	**Collection Date:**	05/20/20 03:00 PM
Lab Order:	2005173	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	0.139	0.0300	0.100		mg/L	1	05/28/20 01:07 PM
Magnesium	116	2.00	6.00		mg/L	20	05/29/20 02:50 PM
Potassium	11.2	0.100	0.300		mg/L	1	05/28/20 01:07 PM
Sodium	236	2.00	6.00		mg/L	20	05/29/20 02:50 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/21/20 04:20 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	750	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:04 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:04 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:04 PM
Alkalinity, Total (As CaCO3)	750	20.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:04 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.139	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:44 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.0340	0.0300	0.100	J	mg/L	1	05/21/20 03:27 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: *02-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-19
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005173-07
Project No:	19134019-3000	**Collection Date:**	05/20/20 04:20 PM
Lab Order:	2005173	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	1.09	0.0300	0.100		mg/L	1	05/28/20 01:09 PM
Magnesium	230	2.00	6.00		mg/L	20	05/29/20 01:48 PM
Potassium	11.6	0.100	0.300		mg/L	1	05/28/20 01:09 PM
Sodium	189	2.00	6.00		mg/L	20	05/29/20 01:48 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	1.47	0.100	0.500		mg/L	1	05/21/20 04:36 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	468	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:24 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:24 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:24 PM
Alkalinity, Total (As CaCO3)	468	20.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:24 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	1.09	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:44 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/21/20 03:27 PM

Qualifiers:

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C - Sample Result or QC discussed in Case Narrative
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SDL - Sample Detection Limit
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DHL Analytical, Inc.

Date: *02-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-22
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005173-08
Project No:	19134019-3000	**Collection Date:**	05/20/20 05:20 PM
Lab Order:	2005173	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	9.58	0.0300	0.100		mg/L	1	05/28/20 01:36 PM
Magnesium	153	2.00	6.00		mg/L	20	05/29/20 01:50 PM
Potassium	5.98	0.100	0.300		mg/L	1	05/28/20 01:36 PM
Sodium	266	2.00	6.00		mg/L	20	05/29/20 01:50 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/21/20 04:52 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	455	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:45 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:45 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:45 PM
Alkalinity, Total (As CaCO3)	455	20.0	20.0		mg/L @ pH 4.54	1	06/01/20 04:45 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	4.80	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	4.78	1.00	2.00	N	mg/L	20	05/22/20 05:05 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/21/20 03:28 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

CLIENT: Golder
Work Order: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200415A

Sample ID: **DCS2-95814** Batch ID: **95814** TestNo: **SW6020B** Units: **mg/L**
SampType: **DCS2** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 3:02:00 PM** Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.0613	0.100	0.0500	0	123	70	130	0	0	
Magnesium	0.305	0.300	0.300	0	102	70	130	0	0	
Sodium	0.292	0.300	0.300	0	97.3	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_200529A**

The QC data in batch 96513 applies to the following samples: 2005173-01B, 2005173-02B, 2005173-03B, 2005173-04B, 2005173-05B, 2005173-06B, 2005173-07B, 2005173-08B

Sample ID: **2005196-06B SD**	Batch ID: **96513**	TestNo: **SW6020B**	Units: **mg/L**				
SampType: **SD**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 1:00:00 PM**	Prep Date: **5/27/2020**				

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	84.5	75.0	0	82.8				2.01	20	
Sodium	362	75.0	0	359				0.873	20	

Sample ID: **2005196-06B PDS**	Batch ID: **96513**	TestNo: **SW6020B**	Units: **mg/L**				
SampType: **PDS**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 1:20:00 PM**	Prep Date: **5/27/2020**				

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	353	15.0	250	82.8	108	75	125			
Sodium	665	15.0	250	359	123	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200529A

Sample ID: **ICV-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 11:56:00 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	2.59	0.300	2.50	0	104	90	110			
Sodium	2.65	0.300	2.50	0	106	90	110			

Sample ID: **LCVL-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 12:09:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.102	0.100	0.100	0	102	80	120			
Magnesium	0.105	0.300	0.100	0	105	80	120			
Sodium	0.100	0.300	0.100	0	100	80	120			

Sample ID: **CCV1-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 1:36:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	4.99	0.100	5.00	0	99.7	90	110			
Magnesium	5.00	0.300	5.00	0	100	90	110			
Sodium	4.96	0.300	5.00	0	99.2	90	110			

Sample ID: **CCV2-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 2:12:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	4.98	0.100	5.00	0	99.5	90	110			
Magnesium	5.07	0.300	5.00	0	101	90	110			
Sodium	4.98	0.300	5.00	0	99.7	90	110			

Sample ID: **CCV3-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 3:04:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	5.01	0.300	5.00	0	100	90	110			
Sodium	4.96	0.300	5.00	0	99.1	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: 2005173
Project: A1 Area Landfill-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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200528A

The QC data in batch 96513 applies to the following samples: 2005173-01B, 2005173-02B, 2005173-03B, 2005173-04B, 2005173-05B, 2005173-06B, 2005173-07B, 2005173-08B

Sample ID: **MB-96513** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:39:00 PM** Prep Date: **5/27/2020**

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-96513** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:41:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.07	0.100	5.00	0	101	80	120			
Magnesium	5.02	0.300	5.00	0	100	80	120			
Potassium	4.96	0.300	5.00	0	99.2	80	120			
Sodium	5.11	0.300	5.00	0	102	80	120			

Sample ID: **LCSD-96513** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:43:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.09	0.100	5.00	0	102	80	120	0.378	15	
Magnesium	5.04	0.300	5.00	0	101	80	120	0.402	15	
Potassium	4.97	0.300	5.00	0	99.5	80	120	0.324	15	
Sodium	5.12	0.300	5.00	0	102	80	120	0.255	15	

Sample ID: **2005196-06B SD** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:50:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	<0.150	0.500	0	0.0808				0	20	
Potassium	14.7	1.50	0	14.6				0.916	20	

Sample ID: **2005196-06B PDS** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 1:16:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.00	0.100	5.00	0.0808	98.5	75	125			
Potassium	19.4	0.300	5.00	14.6	96.6	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200528A

Sample ID: **2005196-06B MS**	Batch ID: **96513**	TestNo: **SW6020B**	Units: **mg/L**		
SampType: **MS**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 1:18:00 PM**	Prep Date: **5/27/2020**		

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	4.96	0.100	5.00	0.0808	97.5	75	125			
Magnesium	90.2	0.300	5.00	83.6	132	75	125			S
Potassium	20.3	0.300	5.00	14.6	114	75	125			
Sodium	383	0.300	5.00	366	334	75	125			S

Sample ID: **2005196-06B MSD**	Batch ID: **96513**	TestNo: **SW6020B**	Units: **mg/L**		
SampType: **MSD**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 1:20:00 PM**	Prep Date: **5/27/2020**		

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	4.93	0.100	5.00	0.0808	97.0	75	125	0.549	15	
Magnesium	89.8	0.300	5.00	83.6	123	75	125	0.502	15	
Potassium	20.4	0.300	5.00	14.6	116	75	125	0.393	15	
Sodium	380	0.300	5.00	366	279	75	125	0.719	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200528A

Sample ID: **ICV-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 11:00:00 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	2.50	0.300	2.50	0	99.8	90	110			
Potassium	2.52	0.300	2.50	0	101	90	110			
Sodium	2.63	0.300	2.50	0	105	90	110			

Sample ID: **LCVL-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 11:07:00 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	0.0947	0.300	0.100	0	94.7	80	120			
Sodium	0.103	0.300	0.100	0	103	80	120			

Sample ID: **CCV2-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 12:23:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.15	0.100	5.00	0	103	90	110			
Magnesium	5.04	0.300	5.00	0	101	90	110			
Potassium	4.94	0.300	5.00	0	98.9	90	110			
Sodium	5.12	0.300	5.00	0	102	90	110			

Sample ID: **CCV3-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 1:31:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.07	0.100	5.00	0	101	90	110			
Magnesium	5.08	0.300	5.00	0	102	90	110			
Potassium	5.03	0.300	5.00	0	101	90	110			
Sodium	5.33	0.300	5.00	0	107	90	110			

Sample ID: **CCV4-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 2:07:00 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			
Potassium	5.02	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_200430A

Sample ID: **DCS2-96153** Batch ID: **96153** TestNo: **E300** Units: **mg/L**
SampType: **DCS2** Run ID: **IC4_200430A** Analysis Date: **4/30/2020 11:31:49 AM** Prep Date: **4/30/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	0.243	0.0500	0.2500	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_200521A

The QC data in batch 96436 applies to the following samples: 2005173-01C, 2005173-02C, 2005173-03C, 2005173-04C, 2005173-05C, 2005173-06C, 2005173-07C, 2005173-08C

Sample ID: **MB-96436**	Batch ID: **96436**	TestNo: **E300**	Units: **mg/L**
SampType: **MBLK**	Run ID: **IC4_200521A**	Analysis Date: **5/21/2020 10:30:34 AM**	Prep Date: **5/21/2020**

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

Sample ID: **LCS-96436**	Batch ID: **96436**	TestNo: **E300**	Units: **mg/L**
SampType: **LCS**	Run ID: **IC4_200521A**	Analysis Date: **5/21/2020 10:46:34 AM**	Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	4.98	0.500	5.000	0	99.7	90	110			

Sample ID: **LCSD-96436**	Batch ID: **96436**	TestNo: **E300**	Units: **mg/L**
SampType: **LCSD**	Run ID: **IC4_200521A**	Analysis Date: **5/21/2020 11:02:34 AM**	Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	4.95	0.500	5.000	0	99.1	90	110	0.578	20	

Sample ID: **2005172-01BMS**	Batch ID: **96436**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC4_200521A**	Analysis Date: **5/21/2020 2:28:21 PM**	Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	43.9	5.00	45.16	0	97.2	90	110			

Sample ID: **2005172-01BMSD**	Batch ID: **96436**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC4_200521A**	Analysis Date: **5/21/2020 2:44:21 PM**	Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	43.6	5.00	45.16	0	96.6	90	110	0.689	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_200521A

Sample ID: **ICV-200521**	Batch ID: **R110595**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC4_200521A**	Analysis Date: **5/21/2020 9:58:34 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	12.0	0.500	12.50	0	96.2	90	110			

Sample ID: **CCV1-200521**	Batch ID: **R110595**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_200521A**	Analysis Date: **5/21/2020 6:12:21 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	4.96	0.500	5.000	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_200601B

The QC data in batch 96589 applies to the following samples: 2005173-01C, 2005173-02C, 2005173-03C, 2005173-04C, 2005173-05C, 2005173-06C, 2005173-07C, 2005173-08C

Sample ID: **MB-96589** Batch ID: **96589** TestNo: **M2320 B** Units: **mg/L @ pH 4.4**
SampType: **MBLK** Run ID: **TITRATOR_200601B** Analysis Date: **6/1/2020 11:49:00 AM** Prep Date: **6/1/2020**

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-96589** Batch ID: **96589** TestNo: **M2320 B** Units: **mg/L @ pH 4.11**
SampType: **LCS** Run ID: **TITRATOR_200601B** Analysis Date: **6/1/2020 11:53:00 AM** Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	54.9	20.0	50.00	0	110	74	129			

Sample ID: **2005173-01C-DUP** Batch ID: **96589** TestNo: **M2320 B** Units: **mg/L @ pH 4.53**
SampType: **DUP** Run ID: **TITRATOR_200601B** Analysis Date: **6/1/2020 1:47:00 PM** Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	190	20.0	0	196.4				3.05	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)	190	20.0	0	196.4				3.05	20	

Sample ID: **2005196-01C-DUP** Batch ID: **96589** TestNo: **M2320 B** Units: **mg/L @ pH 4.5**
SampType: **DUP** Run ID: **TITRATOR_200601B** Analysis Date: **6/1/2020 5:39:00 PM** Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	129	20.0	0	130.5				1.16	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)	129	20.0	0	130.5				1.16	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_200601B

Sample ID: **ICV-200601**	Batch ID: **R110749**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.33**
SampType: **ICV**	Run ID: **TITRATOR_200601B**	Analysis Date: **6/1/2020 11:47:00 AM**	Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	8.32	20.0	0							
Alkalinity, Carbonate (As CaCO3)	93.3	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	102	20.0	100.0	0	102	98	102			

Sample ID: **CCV1-200601**	Batch ID: **R110749**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.37**
SampType: **CCV**	Run ID: **TITRATOR_200601B**	Analysis Date: **6/1/2020 5:25:00 PM**	Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	43.4	20.0	0							
Alkalinity, Carbonate (As CaCO3)	56.3	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	99.7	20.0	100.0	0	99.7	90	110			

Sample ID: **CCV2-200601**	Batch ID: **R110749**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.3**
SampType: **CCV**	Run ID: **TITRATOR_200601B**	Analysis Date: **6/1/2020 8:30:00 PM**	Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	43.5	20.0	0							
Alkalinity, Carbonate (As CaCO3)	55.5	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: **CCV3-200601**	Batch ID: **R110749**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.36**
SampType: **CCV**	Run ID: **TITRATOR_200601B**	Analysis Date: **6/1/2020 8:48:00 PM**	Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	37.8	20.0	0							
Alkalinity, Carbonate (As CaCO3)	61.6	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	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: 2005173
Project: A1 Area Landfill-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
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: 2005173
Project: A1 Area Landfill-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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_200521C

The QC data in batch 96457 applies to the following samples: 2005173-01C, 2005173-02C, 2005173-03C, 2005173-04C, 2005173-05C, 2005173-06C, 2005173-07C, 2005173-08C

Sample ID: **MB-96457**	Batch ID: **96457**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MBLK**	Run ID: **UV/VIS_2_200521C**	Analysis Date: **5/21/2020 3:22:00 PM**	Prep Date: **5/21/2020**

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

Sample ID: **LCS-96457**	Batch ID: **96457**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **LCS**	Run ID: **UV/VIS_2_200521C**	Analysis Date: **5/21/2020 3:23:00 PM**	Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.523	0.100	0.5000	0	105	80	120			

Sample ID: **LCSD-96457**	Batch ID: **96457**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **LCSD**	Run ID: **UV/VIS_2_200521C**	Analysis Date: **5/21/2020 3:23:00 PM**	Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.524	0.100	0.5000	0	105	80	120	0.191	15	

Sample ID: **2005169-01CMS**	Batch ID: **96457**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MS**	Run ID: **UV/VIS_2_200521C**	Analysis Date: **5/21/2020 3:25:00 PM**	Prep Date: **5/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.523	0.100	0.5000	0	105	80	120			

Sample ID: **2005169-01CMSD**	Batch ID: **96457**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MSD**	Run ID: **UV/VIS_2_200521C**	Analysis Date: **5/21/2020 3:25:00 PM**	Prep Date: **5/21/2020**

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	80	120	2.52	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200521C**

Sample ID: **ICV-200521**	Batch ID: **R110609**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_200521C**	Analysis Date: **5/21/2020 3:22:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.202	0.100	0.2000	0	101	85	115			

Sample ID: **CCV1-200521**	Batch ID: **R110609**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200521C**	Analysis Date: **5/21/2020 3:28:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.514	0.100	0.5000	0	103	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200522C**

The QC data in batch 96483 applies to the following samples: 2005173-01A, 2005173-02A, 2005173-03A, 2005173-04A, 2005173-05A, 2005173-06A, 2005173-07A, 2005173-08A

Sample ID: **MB-96483**	Batch ID: **96483**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MBLK**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:39:00 PM**	Prep Date: **5/22/2020**

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

Sample ID: **LCS-96483**	Batch ID: **96483**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **LCS**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:40:00 PM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0973	0.100	0.1000	0	97.3	85	115			N

Sample ID: **LCSD-96483**	Batch ID: **96483**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **LCSD**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:41:00 PM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.102	0.100	0.1000	0	102	85	115	5.07	15	N

Sample ID: **2005173-06AMS**	Batch ID: **96483**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MS**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:54:00 PM**	Prep Date: **5/22/2020**

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

Sample ID: **2005173-06AMSD**	Batch ID: **96483**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MSD**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:54:00 PM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.109	0.100	0.1000	0	109	85	115	4.88	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: 2005173
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200522C**

Sample ID: **ICV-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:38:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0997	0.100	0.1000	0	99.7	85	115			N

Sample ID: **CCV1-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:46:00 PM**	Prep Date:

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

Sample ID: **CCV2-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:51:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.208	0.100	0.2000	0	104	85	115			N

Sample ID: **CCV3-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 5:07:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.216	0.100	0.2000	0	108	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: 2005173
Project: A1 Area Landfill-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	**ng/L @ pH 4.**	**ng/L @ pH 4.**
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

July 10, 2020

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

Order No.: 2005196

RE: A1 Area Landfill-MNA

Dear Will Vienne:

DHL Analytical, Inc. received 10 sample(s) on 5/22/2020 for the analyses presented in the following report.

Revision Number 1 for Work Order 2005196: This revision consists of changing the target analyte list per the client's request. Please replace the original Data Report with this revision.

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

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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*

№ 68561

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: 5-21-20 PAGE 1 OF 1
PO #: DHL WORK ORDER #: 2005146
PROJECT LOCATION OR NAME: A1 AREA LANDFILL - 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	FIELD NOTES
A1-2-OB	01	5-21-20	0735	W		5		X		X			Report Ca per Will V 7/8/20
BMW-33	02		0840			5		X		X			JD
BMW-32	03		0930			5		X		X			"
BMW-11AR	04		1025			5		X		X			"
BMW-18	05		1120			5		X		X			"
BMW-29	06		1215			5		X		X			"
BMW-25	07		1305			5		X		X			"
BMW-28	08		1415			5		X		X			"
BMW-30	09		1510			5		X		X			"
BMW-31	10		1605			5		X		X			'

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 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 ❑ Cl, SO_4, NO3, PO_4, Na, Mg, K Ferrous Fe, Ferric Fe

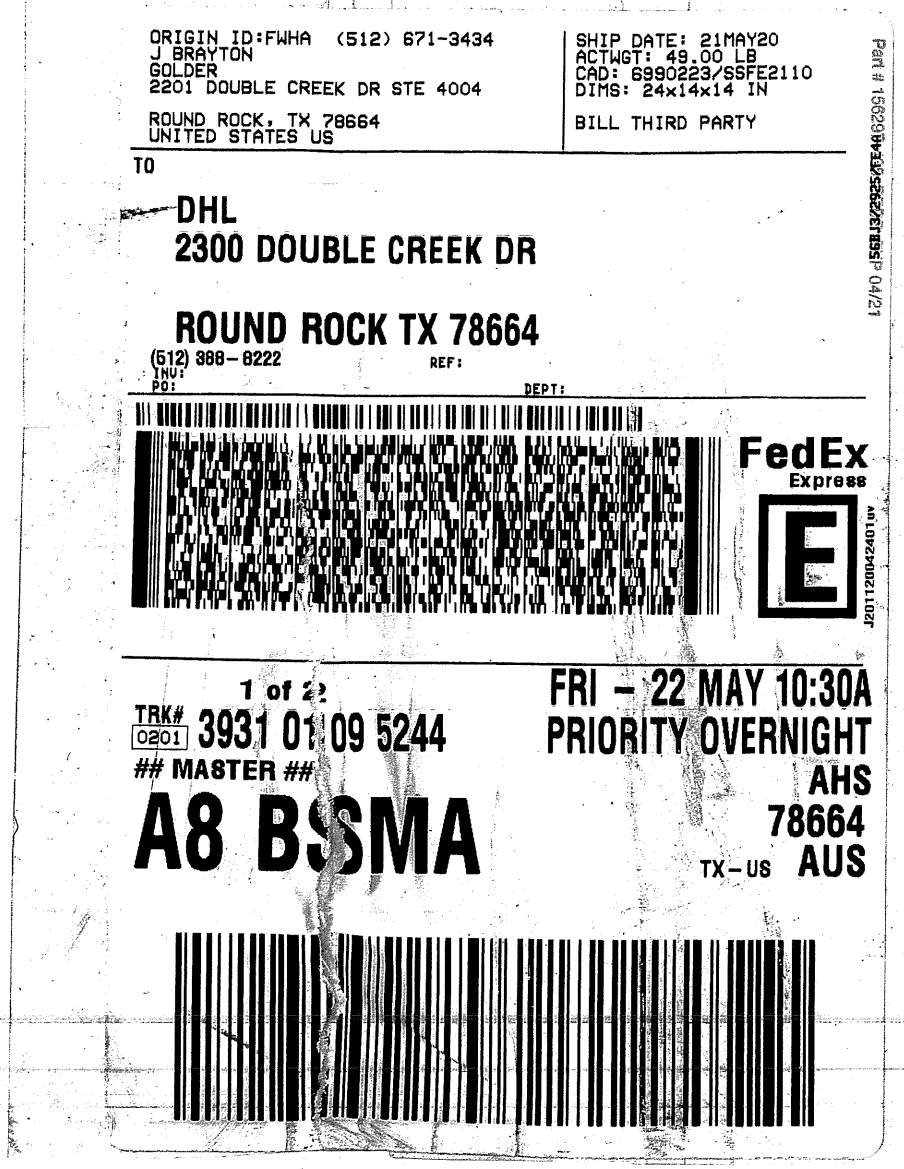
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	5-21-20 1800	FedEx
FedEx	5-22-20 0935	
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)

❑ 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: 1.5/2.4 THERM #: 78
CUSTODY SEALS: ❑ BROKEN ☒ INTACT ❑ NOT USED
CARRIER: ❑ LONE STAR ☒ FEDEX ❑ UPS ❑ OTHER
❑ COURIER DELIVERY
❑ HAND DELIVERED

DHL COC Rev 1 | FEB 2010



ORIGIN ID:FWHA (512) 671-3434
J BRAYTON
GOLDER
2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 21MAY20
ACTWGT: 49.00 LB
CAD: 6990223/SSFE2110
DIMS: 24x14x14 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 3931 0109 5244
MASTER
A8 BSMA

FRI - 22 MAY 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

Part # 156299-442 SSFE 04/21

J2011200424010 un

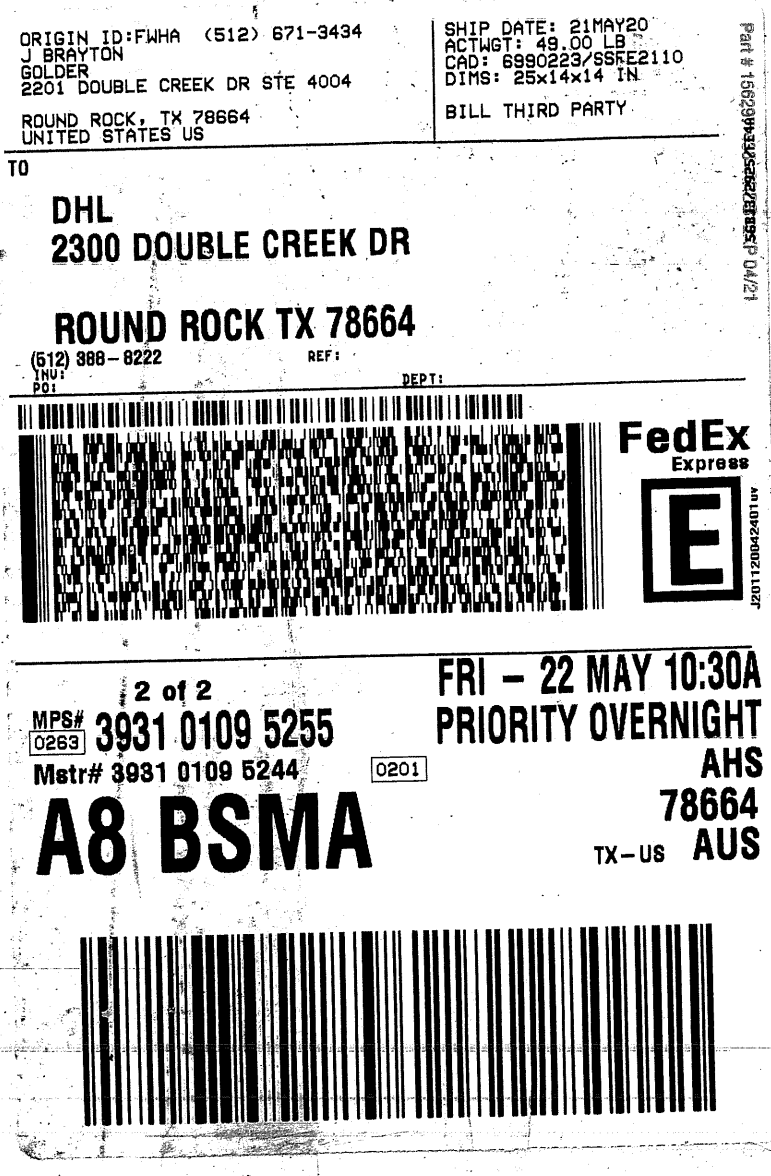
1-51

CUSTODY SEAL

DATE 5-21-20

SIGNATURE John Bra

DHL ANALYTICAL



ORIGIN ID:FWHA (512) 671-3434
J BRAYTON
GOLDER
2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 21MAY20
ACTWGT: 49.00 LB
CAD: 6990223/SSFE2110
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

J2011200424011uv

2 of 2
MPS# 0263 3931 0109 5255
Mstr# 3931 0109 5244 0201

FRI - 22 MAY 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

A8 BSMA

Part # 1502699-13 DEC 2019

2-4

CUSTODY SEAL

DATE 5-21-20

SIGNATURE

DHL ANALYTICAL

older

ake PDP

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Golder** Date Received: **5/22/2020**

Work Order Number **2005196** Received by: **JH**

Checklist completed by: _____ 5/22/2020 Reviewed by JD 5/22/2020
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 ☐	**1.5** °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: A1 Area Landfill-MNA	**LRC Date:** 7/10/2020
Reviewer Name: Angie O'Donnell	**Laboratory Work Order: 2005196**
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: A1 Area Landfill-MNA	**LRC Date:** 7/10/2020
Reviewer Name: Angie O'Donnell	**Laboratory Work Order: 2005196**
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			**S1-04**
		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

07/10/20
Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *10-Jul-20*

CLIENT: Golder
Project: A1 Area Landfill-MNA
Lab Order: 2005196

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 - Ferric Iron Analysis (The calculation is not NELAP Certified)
Method M4500-P E - Orthophosphate Analysis

Exception Report R1-01

The samples were received and log-in performed on 5/22/2020. A total of 10 samples were received and analyzed. The samples arrived in good condition and were properly packaged.

Exception Report R7-03

For Metals Analysis, the recoveries of up to two analytes for the Matrix Spike and Matrix Spike Duplicate (2005196-06 MS/MSD) were above the method control limits. These are flagged accordingly in the QC Summary Report. These analytes were 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.

Exception Report S1-04

For Metals Analysis, Calcium was reported above the upper calibration range for Sample A1-2-OB, due to late change to the target analyte list. The result is flagged C and no further corrective action was taken.

DHL Analytical, Inc.

Date: *03-Jun-20*

CLIENT: Golder
Project: A1 Area Landfill-MNA
Lab Order: 2005196

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2005196-01	A1-2-OB		05/21/20 07:35 AM	5/22/2020
2005196-02	BMW-33		05/21/20 08:40 AM	5/22/2020
2005196-03	BMW-32		05/21/20 09:30 AM	5/22/2020
2005196-04	BMW-11AR		05/21/20 10:25 AM	5/22/2020
2005196-05	BMW-18		05/21/20 11:20 AM	5/22/2020
2005196-06	BMW-29		05/21/20 12:15 PM	5/22/2020
2005196-07	BMW-25		05/21/20 01:05 PM	5/22/2020
2005196-08	BMW-28		05/21/20 02:15 PM	5/22/2020
2005196-09	BMW-30		05/21/20 03:10 PM	5/22/2020
2005196-10	BMW-31		05/21/20 04:05 PM	5/22/2020

Lab Order: 2005196
Client: Golder
Project: A1 Area Landfill-MNA

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005196-01A	A1-2-OB	05/21/20 07:35 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005196-01B	A1-2-OB	05/21/20 07:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005196-01C	A1-2-OB	05/21/20 07:35 AM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	A1-2-OB	05/21/20 07:35 AM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	A1-2-OB	05/21/20 07:35 AM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	A1-2-OB	05/21/20 07:35 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/22/20 01:06 PM	96479
2005196-02A	BMW-33	05/21/20 08:40 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005196-02B	BMW-33	05/21/20 08:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-33	05/21/20 08:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005196-02C	BMW-33	05/21/20 08:40 AM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-33	05/21/20 08:40 AM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-33	05/21/20 08:40 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/22/20 01:06 PM	96479
2005196-03A	BMW-32	05/21/20 09:30 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
	BMW-32	05/21/20 09:30 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005196-03B	BMW-32	05/21/20 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-32	05/21/20 09:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005196-03C	BMW-32	05/21/20 09:30 AM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-32	05/21/20 09:30 AM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-32	05/21/20 09:30 AM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-32	05/21/20 09:30 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/22/20 01:06 PM	96479
2005196-04A	BMW-11AR	05/21/20 10:25 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005196-04B	BMW-11AR	05/21/20 10:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-11AR	05/21/20 10:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005196-04C	BMW-11AR	05/21/20 10:25 AM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-11AR	05/21/20 10:25 AM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-11AR	05/21/20 10:25 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/22/20 01:06 PM	96479
2005196-05A	BMW-18	05/21/20 11:20 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005196-05B	BMW-18	05/21/20 11:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513

Lab Order: 2005196
Client: Golder
Project: A1 Area Landfill-MNA

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005196-05B	BMW-18	05/21/20 11:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005196-05C	BMW-18	05/21/20 11:20 AM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-18	05/21/20 11:20 AM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-18	05/21/20 11:20 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/22/20 01:06 PM	96479
2005196-06A	BMW-29	05/21/20 12:15 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005196-06B	BMW-29	05/21/20 12:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-29	05/21/20 12:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005196-06C	BMW-29	05/21/20 12:15 PM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-29	05/21/20 12:15 PM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-29	05/21/20 12:15 PM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-29	05/21/20 12:15 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/22/20 01:06 PM	96479
2005196-07A	BMW-25	05/21/20 01:05 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005196-07B	BMW-25	05/21/20 01:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-25	05/21/20 01:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005196-07C	BMW-25	05/21/20 01:05 PM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-25	05/21/20 01:05 PM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-25	05/21/20 01:05 PM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-25	05/21/20 01:05 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/22/20 01:06 PM	96479
2005196-08A	BMW-28	05/21/20 02:15 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005196-08B	BMW-28	05/21/20 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-28	05/21/20 02:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005196-08C	BMW-28	05/21/20 02:15 PM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-28	05/21/20 02:15 PM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-28	05/21/20 02:15 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/22/20 01:06 PM	96479
2005196-09A	BMW-30	05/21/20 03:10 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005196-09B	BMW-30	05/21/20 03:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-30	05/21/20 03:10 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005196-09C	BMW-30	05/21/20 03:10 PM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589

Lab Order: 2005196
Client: Golder
Project: A1 Area Landfill-MNA

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005196-09C	BMW-30	05/21/20 03:10 PM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-30	05/21/20 03:10 PM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-30	05/21/20 03:10 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/22/20 01:06 PM	96479
2005196-10A	BMW-31	05/21/20 04:05 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/22/20 03:45 PM	96483
2005196-10B	BMW-31	05/21/20 04:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
	BMW-31	05/21/20 04:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/27/20 08:18 AM	96513
2005196-10C	BMW-31	05/21/20 04:05 PM	Aqueous	M2320 B	Alkalinity Preparation	06/01/20 11:05 AM	96589
	BMW-31	05/21/20 04:05 PM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-31	05/21/20 04:05 PM	Aqueous	E300	Anion Preparation	05/22/20 09:15 AM	96472
	BMW-31	05/21/20 04:05 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/22/20 01:06 PM	96479

Lab Order: 2005196
Client: Golder
Project: A1 Area Landfill-MNA

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005196-01A	A1-2-OB	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	A1-2-OB	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:45 PM	UV/VIS_2_200522C
2005196-01B	A1-2-OB	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:38 PM	ICP-MS5_200528A
2005196-01C	A1-2-OB	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 05:32 PM	TITRATOR_200601B
	A1-2-OB	Aqueous	E300	Anions by IC method - Water	96472	1	05/22/20 12:32 PM	IC2_200522A
	A1-2-OB	Aqueous	E300	Anions by IC method - Water	96472	10	05/22/20 04:48 PM	IC2_200522A
	A1-2-OB	Aqueous	M4500-P E	Orthophosphate	96479	1	05/22/20 01:51 PM	UV/VIS_2_200522A
2005196-02A	BMW-33	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-33	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:47 PM	UV/VIS_2_200522C
2005196-02B	BMW-33	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	10	05/29/20 01:52 PM	ICP-MS4_200529A
	BMW-33	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:41 PM	ICP-MS5_200528A
2005196-02C	BMW-33	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 06:02 PM	TITRATOR_200601B
	BMW-33	Aqueous	E300	Anions by IC method - Water	96472	1	05/22/20 12:48 PM	IC2_200522A
	BMW-33	Aqueous	M4500-P E	Orthophosphate	96479	1	05/22/20 01:52 PM	UV/VIS_2_200522A
2005196-03A	BMW-32	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-32	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:47 PM	UV/VIS_2_200522C
	BMW-32	Aqueous	M3500-Fe D	Ferrous Iron	96483	50	05/22/20 05:00 PM	UV/VIS_2_200522C
2005196-03B	BMW-32	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:43 PM	ICP-MS5_200528A
	BMW-32	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	10	05/29/20 01:54 PM	ICP-MS4_200529A
2005196-03C	BMW-32	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 06:19 PM	TITRATOR_200601B
	BMW-32	Aqueous	E300	Anions by IC method - Water	96472	1	05/22/20 01:04 PM	IC2_200522A
	BMW-32	Aqueous	E300	Anions by IC method - Water	96472	10	05/22/20 05:36 PM	IC2_200522A
	BMW-32	Aqueous	M4500-P E	Orthophosphate	96479	1	05/22/20 01:53 PM	UV/VIS_2_200522A
2005196-04A	BMW-11AR	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-11AR	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:48 PM	UV/VIS_2_200522C
2005196-04B	BMW-11AR	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	10	05/29/20 01:56 PM	ICP-MS4_200529A
	BMW-11AR	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:45 PM	ICP-MS5_200528A
2005196-04C	BMW-11AR	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 06:40 PM	TITRATOR_200601B

Lab Order: 2005196
Client: Golder
Project: A1 Area Landfill-MNA

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005196-04C	BMW-11AR	Aqueous	E300	Anions by IC method - Water	96472	1	05/22/20 01:20 PM	IC2_200522A
	BMW-11AR	Aqueous	M4500-P E	Orthophosphate	96479	1	05/22/20 01:53 PM	UV/VIS_2_200522A
2005196-05A	BMW-18	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-18	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:48 PM	UV/VIS_2_200522C
2005196-05B	BMW-18	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	10	05/29/20 01:58 PM	ICP-MS4_200529A
	BMW-18	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:47 PM	ICP-MS5_200528A
2005196-05C	BMW-18	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 06:50 PM	TITRATOR_200601B
	BMW-18	Aqueous	E300	Anions by IC method - Water	96472	1	05/22/20 01:36 PM	IC2_200522A
	BMW-18	Aqueous	M4500-P E	Orthophosphate	96479	1	05/22/20 01:53 PM	UV/VIS_2_200522A
2005196-06A	BMW-29	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-29	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:49 PM	UV/VIS_2_200522C
2005196-06B	BMW-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	50	05/29/20 12:58 PM	ICP-MS4_200529A
	BMW-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 12:48 PM	ICP-MS5_200528A
2005196-06C	BMW-29	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 07:18 PM	TITRATOR_200601B
	BMW-29	Aqueous	E300	Anions by IC method - Water	96472	1	05/22/20 01:52 PM	IC2_200522A
	BMW-29	Aqueous	E300	Anions by IC method - Water	96472	10	05/22/20 05:52 PM	IC2_200522A
	BMW-29	Aqueous	M4500-P E	Orthophosphate	96479	1	05/22/20 01:53 PM	UV/VIS_2_200522A
2005196-07A	BMW-25	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-25	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:49 PM	UV/VIS_2_200522C
2005196-07B	BMW-25	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	20	05/29/20 02:00 PM	ICP-MS4_200529A
	BMW-25	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:49 PM	ICP-MS5_200528A
2005196-07C	BMW-25	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 07:43 PM	TITRATOR_200601B
	BMW-25	Aqueous	E300	Anions by IC method - Water	96472	1	05/22/20 02:08 PM	IC2_200522A
	BMW-25	Aqueous	E300	Anions by IC method - Water	96472	10	05/22/20 06:08 PM	IC2_200522A
	BMW-25	Aqueous	M4500-P E	Orthophosphate	96479	1	05/22/20 01:54 PM	UV/VIS_2_200522A
2005196-08A	BMW-28	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-28	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:50 PM	UV/VIS_2_200522C
2005196-08B	BMW-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:51 PM	ICP-MS5_200528A

Lab Order: 2005196
Client: Golder
Project: A1 Area Landfill-MNA

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005196-08B	BMW-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	50	05/29/20 02:02 PM	ICP-MS4_200529A
2005196-08C	BMW-28	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 08:11 PM	TITRATOR_200601B
	BMW-28	Aqueous	E300	Anions by IC method - Water	96472	1	05/22/20 02:24 PM	IC2_200522A
	BMW-28	Aqueous	M4500-P E	Orthophosphate	96479	1	05/22/20 01:54 PM	UV/VIS_2_200522A
2005196-09A	BMW-30	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-30	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:50 PM	UV/VIS_2_200522C
2005196-09B	BMW-30	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	10	05/29/20 02:04 PM	ICP-MS4_200529A
	BMW-30	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:54 PM	ICP-MS5_200528A
2005196-09C	BMW-30	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 08:25 PM	TITRATOR_200601B
	BMW-30	Aqueous	E300	Anions by IC method - Water	96472	1	05/22/20 02:40 PM	IC2_200522A
	BMW-30	Aqueous	E300	Anions by IC method - Water	96472	10	05/22/20 06:24 PM	IC2_200522A
	BMW-30	Aqueous	M4500-P E	Orthophosphate	96479	1	05/22/20 01:55 PM	UV/VIS_2_200522A
2005196-10A	BMW-31	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R110770	1	06/02/20	UV/VIS_2_200602A
	BMW-31	Aqueous	M3500-Fe D	Ferrous Iron	96483	1	05/22/20 04:50 PM	UV/VIS_2_200522C
2005196-10B	BMW-31	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	10	05/29/20 02:06 PM	ICP-MS4_200529A
	BMW-31	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96513	1	05/28/20 01:56 PM	ICP-MS5_200528A
2005196-10C	BMW-31	Aqueous	M2320 B	Alkalinity	96589	1	06/01/20 08:43 PM	TITRATOR_200601B
	BMW-31	Aqueous	E300	Anions by IC method - Water	96472	1	05/22/20 02:56 PM	IC2_200522A
	BMW-31	Aqueous	E300	Anions by IC method - Water	96472	10	05/22/20 06:40 PM	IC2_200522A
	BMW-31	Aqueous	M4500-P E	Orthophosphate	96479	1	05/22/20 01:56 PM	UV/VIS_2_200522A

DHL Analytical, Inc.

Date: *10-Jul-20*

CLIENT:	Golder	**Client Sample ID:**	A1-2-OB
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005196-01
Project No:	19134019-3000	**Collection Date:**	05/21/20 07:35 AM
Lab Order:	2005196	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Calcium	50.8	0.100	0.300	C	mg/L	1	05/28/20 01:38 PM
Iron	0.0871	0.0300	0.100	J	mg/L	1	05/28/20 01:38 PM
Magnesium	5.50	0.100	0.300		mg/L	1	05/28/20 01:38 PM
Potassium	3.96	0.100	0.300		mg/L	1	05/28/20 01:38 PM
Sodium	20.7	0.100	0.300		mg/L	1	05/28/20 01:38 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	18.8	0.300	1.00		mg/L	1	05/22/20 12:32 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/22/20 12:32 PM
Nitrate-N	0.826	0.100	0.500		mg/L	1	05/22/20 12:32 PM
Sulfate	29.4	1.00	3.00		mg/L	1	05/22/20 12:32 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	130	10.0	20.0		mg/L @ pH 4.5	1	06/01/20 05:32 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	06/01/20 05:32 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	06/01/20 05:32 PM
Alkalinity, Total (As CaCO3)	130	20.0	20.0		mg/L @ pH 4.5	1	06/01/20 05:32 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.0871	0.0500	0.100	JN	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:45 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.121	0.0300	0.100		mg/L	1	05/22/20 01:51 PM

Qualifiers:

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J - Analyte detected between SDL and RL
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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: *10-Jul-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-33
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005196-02
Project No:	19134019-3000	**Collection Date:**	05/21/20 08:40 AM
Lab Order:	2005196	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Calcium	107	1.00	3.00		mg/L	10	05/29/20 01:52 PM
Iron	0.262	0.0300	0.100		mg/L	1	05/28/20 01:41 PM
Magnesium	63.8	1.00	3.00		mg/L	10	05/29/20 01:52 PM
Potassium	6.55	0.100	0.300		mg/L	1	05/28/20 01:41 PM
Sodium	156	1.00	3.00		mg/L	10	05/29/20 01:52 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	0.325	0.100	0.500	J	mg/L	1	05/22/20 12:48 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	562	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:02 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:02 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:02 PM
Alkalinity, Total (As CaCO3)	562	20.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:02 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.262	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:47 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/22/20 01:52 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
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DHL Analytical, Inc.

Date: *10-Jul-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-32
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005196-03
Project No:	19134019-3000	**Collection Date:**	05/21/20 09:30 AM
Lab Order:	2005196	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Calcium	118	1.00	3.00		mg/L	10	05/29/20 01:54 PM
Iron	31.5	0.300	1.00		mg/L	10	05/29/20 01:54 PM
Magnesium	92.4	1.00	3.00		mg/L	10	05/29/20 01:54 PM
Potassium	4.40	0.100	0.300		mg/L	1	05/28/20 01:43 PM
Sodium	189	1.00	3.00		mg/L	10	05/29/20 01:54 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	288	3.00	10.0		mg/L	10	05/22/20 05:36 PM
Fluoride	0.557	0.100	0.400		mg/L	1	05/22/20 01:04 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/22/20 01:04 PM
Sulfate	333	10.0	30.0		mg/L	10	05/22/20 05:36 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	337	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:19 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:19 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:19 PM
Alkalinity, Total (As CaCO3)	337	20.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:19 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	21.2	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	10.3	2.50	5.00	N	mg/L	50	05/22/20 05:00 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.0370	0.0300	0.100	J	mg/L	1	05/22/20 01:53 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: *10-Jul-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-11AR
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005196-04
Project No:	19134019-3000	**Collection Date:**	05/21/20 10:25 AM
Lab Order:	2005196	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Calcium	85.8	1.00	3.00		mg/L	10	05/29/20 01:56 PM
Iron	0.491	0.0300	0.100		mg/L	1	05/28/20 01:45 PM
Magnesium	18.0	0.100	0.300		mg/L	1	05/28/20 01:45 PM
Potassium	21.7	0.100	0.300		mg/L	1	05/28/20 01:45 PM
Sodium	27.2	1.00	3.00		mg/L	10	05/29/20 01:56 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/22/20 01:20 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	472	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 06:40 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 06:40 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 06:40 PM
Alkalinity, Total (As CaCO3)	472	20.0	20.0		mg/L @ pH 4.54	1	06/01/20 06:40 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.250	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	0.241	0.0500	0.100	N	mg/L	1	05/22/20 04:48 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/22/20 01:53 PM

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DHL Analytical, Inc.

Date: *10-Jul-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-18
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005196-05
Project No:	19134019-3000	**Collection Date:**	05/21/20 11:20 AM
Lab Order:	2005196	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Calcium	10.0	1.00	3.00		mg/L	10	05/29/20 01:58 PM
Iron	0.165	0.0300	0.100		mg/L	1	05/28/20 01:47 PM
Magnesium	2.31	0.100	0.300		mg/L	1	05/28/20 01:47 PM
Potassium	2.35	0.100	0.300		mg/L	1	05/28/20 01:47 PM
Sodium	178	1.00	3.00		mg/L	10	05/29/20 01:58 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	0.616	0.100	0.500		mg/L	1	05/22/20 01:36 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	270	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:50 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:50 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:50 PM
Alkalinity, Total (As CaCO3)	270	20.0	20.0		mg/L @ pH 4.53	1	06/01/20 06:50 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.165	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:48 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.134	0.0300	0.100		mg/L	1	05/22/20 01:53 PM

Qualifiers:

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S - Spike Recovery outside control limits
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DHL Analytical, Inc.

Date: *10-Jul-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-29
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005196-06
Project No:	19134019-3000	**Collection Date:**	05/21/20 12:15 PM
Lab Order:	2005196	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Calcium	164	5.00	15.0		mg/L	50	05/29/20 12:58 PM
Iron	0.0808	0.0300	0.100	J	mg/L	1	05/28/20 12:48 PM
Magnesium	82.8	5.00	15.0		mg/L	50	05/29/20 12:58 PM
Potassium	14.6	0.100	0.300		mg/L	1	05/28/20 12:48 PM
Sodium	359	5.00	15.0		mg/L	50	05/29/20 12:58 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	14.4	0.300	1.00		mg/L	1	05/22/20 01:52 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/22/20 01:52 PM
Nitrate-N	2.02	0.100	0.500		mg/L	1	05/22/20 01:52 PM
Sulfate	820	10.0	30.0		mg/L	10	05/22/20 05:52 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	693	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 07:18 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 07:18 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 07:18 PM
Alkalinity, Total (As CaCO3)	693	20.0	20.0		mg/L @ pH 4.54	1	06/01/20 07:18 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.0808	0.0500	0.100	JN	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:49 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.0540	0.0300	0.100	J	mg/L	1	05/22/20 01:53 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: *10-Jul-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-25
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005196-07
Project No:	19134019-3000	**Collection Date:**	05/21/20 01:05 PM
Lab Order:	2005196	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Calcium	127	2.00	6.00		mg/L	20	05/29/20 02:00 PM
Iron	0.164	0.0300	0.100		mg/L	1	05/28/20 01:49 PM
Magnesium	64.2	2.00	6.00		mg/L	20	05/29/20 02:00 PM
Potassium	11.8	0.100	0.300		mg/L	1	05/28/20 01:49 PM
Sodium	281	2.00	6.00		mg/L	20	05/29/20 02:00 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	14.0	0.300	1.00		mg/L	1	05/22/20 02:08 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/22/20 02:08 PM
Nitrate-N	1.73	0.100	0.500		mg/L	1	05/22/20 02:08 PM
Sulfate	704	10.0	30.0		mg/L	10	05/22/20 06:08 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	604	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 07:43 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 07:43 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 07:43 PM
Alkalinity, Total (As CaCO3)	604	20.0	20.0		mg/L @ pH 4.54	1	06/01/20 07:43 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.164	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:49 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/22/20 01:54 PM

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DHL Analytical, Inc.

Date: *10-Jul-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-28
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005196-08
Project No:	19134019-3000	**Collection Date:**	05/21/20 02:15 PM
Lab Order:	2005196	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Calcium	264	5.00	15.0		mg/L	50	05/29/20 02:02 PM
Iron	0.170	0.0300	0.100		mg/L	1	05/28/20 01:51 PM
Magnesium	173	5.00	15.0		mg/L	50	05/29/20 02:02 PM
Potassium	18.6	0.100	0.300		mg/L	1	05/28/20 01:51 PM
Sodium	535	5.00	15.0		mg/L	50	05/29/20 02:02 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	1.04	0.100	0.500		mg/L	1	05/22/20 02:24 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	723	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 08:11 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 08:11 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 08:11 PM
Alkalinity, Total (As CaCO3)	723	20.0	20.0		mg/L @ pH 4.54	1	06/01/20 08:11 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.170	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:50 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/22/20 01:54 PM

Qualifiers:

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DHL Analytical, Inc.

Date: *10-Jul-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-30
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005196-09
Project No:	19134019-3000	**Collection Date:**	05/21/20 03:10 PM
Lab Order:	2005196	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Calcium	112	1.00	3.00		mg/L	10	05/29/20 02:04 PM
Iron	0.303	0.0300	0.100		mg/L	1	05/28/20 01:54 PM
Magnesium	50.5	1.00	3.00		mg/L	10	05/29/20 02:04 PM
Potassium	21.3	0.100	0.300		mg/L	1	05/28/20 01:54 PM
Sodium	132	1.00	3.00		mg/L	10	05/29/20 02:04 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	26.7	0.300	1.00		mg/L	1	05/22/20 02:40 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/22/20 02:40 PM
Nitrate-N	0.464	0.100	0.500	J	mg/L	1	05/22/20 02:40 PM
Sulfate	485	10.0	30.0		mg/L	10	05/22/20 06:24 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	317	10.0	20.0		mg/L @ pH 4.52	1	06/01/20 08:25 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	06/01/20 08:25 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	06/01/20 08:25 PM
Alkalinity, Total (As CaCO3)	317	20.0	20.0		mg/L @ pH 4.52	1	06/01/20 08:25 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.303	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:50 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/22/20 01:55 PM

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DHL Analytical, Inc.

Date: *10-Jul-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-31
Project:	A1 Area Landfill-MNA	**Lab ID:**	2005196-10
Project No:	19134019-3000	**Collection Date:**	05/21/20 04:05 PM
Lab Order:	2005196	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Calcium	94.5	1.00	3.00		mg/L	10	05/29/20 02:06 PM
Iron	0.185	0.0300	0.100		mg/L	1	05/28/20 01:56 PM
Magnesium	44.2	1.00	3.00		mg/L	10	05/29/20 02:06 PM
Potassium	12.7	0.100	0.300		mg/L	1	05/28/20 01:56 PM
Sodium	116	1.00	3.00		mg/L	10	05/29/20 02:06 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	21.2	0.300	1.00		mg/L	1	05/22/20 02:56 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/22/20 02:56 PM
Nitrate-N	0.599	0.100	0.500		mg/L	1	05/22/20 02:56 PM
Sulfate	368	10.0	30.0		mg/L	10	05/22/20 06:40 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	263	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 08:43 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 08:43 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/01/20 08:43 PM
Alkalinity, Total (As CaCO3)	263	20.0	20.0		mg/L @ pH 4.54	1	06/01/20 08:43 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.185	0.0500	0.100	N	mg/L	1	06/02/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/22/20 04:50 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/22/20 01:56 PM

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SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

CLIENT: Golder
Work Order: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200415A

Sample ID: **DCS2-95814** Batch ID: **95814** TestNo: **SW6020B** Units: **mg/L**
SampType: **DCS2** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 3:02:00 PM** Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.296	0.300	0.300	0	98.6	70	130	0	0	
Iron	0.0613	0.100	0.0500	0	123	70	130	0	0	
Magnesium	0.305	0.300	0.300	0	102	70	130	0	0	
Sodium	0.292	0.300	0.300	0	97.3	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200529A

The QC data in batch 96513 applies to the following samples: 2005196-01B, 2005196-02B, 2005196-03B, 2005196-04B, 2005196-05B, 2005196-06B, 2005196-07B, 2005196-08B, 2005196-09B, 2005196-10B

Sample ID: **2005196-06B SD** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_200529A** Analysis Date: **5/29/2020 1:00:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	164	75.0	0	164				0.190	20	
Magnesium	84.5	75.0	0	82.8				2.01	20	
Sodium	362	75.0	0	359				0.873	20	

Sample ID: **2005196-06B PDS** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_200529A** Analysis Date: **5/29/2020 1:20:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	431	15.0	250	164	107	75	125			
Magnesium	353	15.0	250	82.8	108	75	125			
Sodium	665	15.0	250	359	123	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200529A

Sample ID: **ICV-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 11:56:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.51	0.300	2.50	0	100	90	110			
Iron	2.54	0.100	2.50	0	102	90	110			
Magnesium	2.59	0.300	2.50	0	104	90	110			
Sodium	2.65	0.300	2.50	0	106	90	110			

Sample ID: **LCVL-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 12:09:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0988	0.300	0.100	0	98.8	80	120			
Iron	0.102	0.100	0.100	0	102	80	120			
Magnesium	0.105	0.300	0.100	0	105	80	120			
Sodium	0.100	0.300	0.100	0	100	80	120			

Sample ID: **CCV1-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 1:36:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.60	0.300	5.00	0	92.0	90	110			
Iron	4.99	0.100	5.00	0	99.7	90	110			
Magnesium	5.00	0.300	5.00	0	100	90	110			
Sodium	4.96	0.300	5.00	0	99.2	90	110			

Sample ID: **CCV2-200529**	Batch ID: **R110716**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_200529A**	Analysis Date: **5/29/2020 2:12:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.78	0.300	5.00	0	95.6	90	110			
Iron	4.98	0.100	5.00	0	99.5	90	110			
Magnesium	5.07	0.300	5.00	0	101	90	110			
Sodium	4.98	0.300	5.00	0	99.7	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: 2005196
Project: A1 Area Landfill-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
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	

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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200528A

The QC data in batch 96513 applies to the following samples: 2005196-01B, 2005196-02B, 2005196-03B, 2005196-04B, 2005196-05B, 2005196-06B, 2005196-07B, 2005196-08B, 2005196-09B, 2005196-10B

Sample ID: **MB-96513** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:39:00 PM** Prep Date: **5/27/2020**

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

Sample ID: **LCS-96513** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:41:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.04	0.300	5.00	0	101	80	120			
Iron	5.07	0.100	5.00	0	101	80	120			
Magnesium	5.02	0.300	5.00	0	100	80	120			
Potassium	4.96	0.300	5.00	0	99.2	80	120			
Sodium	5.11	0.300	5.00	0	102	80	120			

Sample ID: **LCSD-96513** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:43:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.99	0.300	5.00	0	99.7	80	120	1.14	15	
Iron	5.09	0.100	5.00	0	102	80	120	0.378	15	
Magnesium	5.04	0.300	5.00	0	101	80	120	0.402	15	
Potassium	4.97	0.300	5.00	0	99.5	80	120	0.324	15	
Sodium	5.12	0.300	5.00	0	102	80	120	0.255	15	

Sample ID: **2005196-06B SD** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 12:50:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	<0.150	0.500	0	0.0808				0	20	
Potassium	14.7	1.50	0	14.6				0.916	20	

Sample ID: **2005196-06B PDS** Batch ID: **96513** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 1:16:00 PM** Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.00	0.100	5.00	0.0808	98.5	75	125			
Potassium	19.4	0.300	5.00	14.6	96.6	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200528A

Sample ID: **2005196-06B MS**	Batch ID: **96513**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 1:18:00 PM**	Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	175	0.300	5.00	171	92.0	75	125			
Iron	4.96	0.100	5.00	0.0808	97.5	75	125			
Magnesium	90.2	0.300	5.00	83.6	132	75	125			S
Potassium	20.3	0.300	5.00	14.6	114	75	125			
Sodium	383	0.300	5.00	366	334	75	125			S

Sample ID: **2005196-06B MSD**	Batch ID: **96513**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 1:20:00 PM**	Prep Date: **5/27/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	174	0.300	5.00	171	69.1	75	125	0.656	15	S
Iron	4.93	0.100	5.00	0.0808	97.0	75	125	0.549	15	
Magnesium	89.8	0.300	5.00	83.6	123	75	125	0.502	15	
Potassium	20.4	0.300	5.00	14.6	116	75	125	0.393	15	
Sodium	380	0.300	5.00	366	279	75	125	0.719	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200528A

Sample ID: **ICV-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 11:00:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.59	0.300	2.50	0	104	90	110			
Iron	2.54	0.100	2.50	0	102	90	110			
Magnesium	2.50	0.300	2.50	0	99.8	90	110			
Potassium	2.52	0.300	2.50	0	101	90	110			
Sodium	2.63	0.300	2.50	0	105	90	110			

Sample ID: **LCVL-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 11:07:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.107	0.300	0.100	0	107	80	120			
Iron	0.101	0.100	0.100	0	101	80	120			
Magnesium	0.101	0.300	0.100	0	101	80	120			
Potassium	0.0947	0.300	0.100	0	94.7	80	120			
Sodium	0.103	0.300	0.100	0	103	80	120			

Sample ID: **CCV2-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 12:23:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.06	0.300	5.00	0	101	90	110			
Iron	5.15	0.100	5.00	0	103	90	110			
Magnesium	5.04	0.300	5.00	0	101	90	110			
Potassium	4.94	0.300	5.00	0	98.9	90	110			
Sodium	5.12	0.300	5.00	0	102	90	110			

Sample ID: **CCV3-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 1:31:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.06	0.300	5.00	0	101	90	110			
Iron	5.07	0.100	5.00	0	101	90	110			
Magnesium	5.08	0.300	5.00	0	102	90	110			
Potassium	5.03	0.300	5.00	0	101	90	110			
Sodium	5.33	0.300	5.00	0	107	90	110			

Sample ID: **CCV4-200528**	Batch ID: **R110690**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200528A**	Analysis Date: **5/28/2020 2:07:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.01	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_200528A**

Sample ID: **CCV4-200528** Batch ID: **R110690** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200528A** Analysis Date: **5/28/2020 2:07:00 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	5.10	0.300	5.00	0	102	90	110			
Potassium	5.02	0.300	5.00	0	100	90	110			
Sodium	5.38	0.300	5.00	0	108	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200519B

Sample ID: **DCS2-96406** Batch ID: **96406** TestNo: **E300** Units: **mg/L**
SampType: **DCS2** Run ID: **IC2_200519B** Analysis Date: **5/19/2020 11:56:12 AM** Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	0.440	1.00	0.5000	0	88.1	70	130	0	0	
Fluoride	0.176	0.400	0.2000	0	87.8	70	130	0	0	
Nitrate-N	0.254	0.0500	0.2500	0	102	70	130	0	0	
Sulfate	1.69	3.00	1.500	0	113	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200522A

The QC data in batch 96472 applies to the following samples: 2005196-01C, 2005196-02C, 2005196-03C, 2005196-04C, 2005196-05C, 2005196-06C, 2005196-07C, 2005196-08C, 2005196-09C, 2005196-10C

Sample ID: **MB-96472** Batch ID: **96472** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_200522A** Analysis Date: **5/22/2020 11:09:08 AM** Prep Date: **5/22/2020**

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-96472** Batch ID: **96472** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_200522A** Analysis Date: **5/22/2020 11:25:08 AM** Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.83	1.00	10.00	0	98.3	90	110			
Fluoride	3.78	0.400	4.000	0	94.4	90	110			
Nitrate-N	4.88	0.500	5.000	0	97.6	90	110			
Sulfate	29.6	3.00	30.00	0	98.7	90	110			

Sample ID: **LCSD-96472** Batch ID: **96472** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_200522A** Analysis Date: **5/22/2020 11:41:08 AM** Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.80	1.00	10.00	0	98.0	90	110	0.340	20	
Fluoride	3.78	0.400	4.000	0	94.4	90	110	0.049	20	
Nitrate-N	4.86	0.500	5.000	0	97.2	90	110	0.434	20	
Sulfate	29.5	3.00	30.00	0	98.2	90	110	0.454	20	

Sample ID: **2005196-01CMS** Batch ID: **96472** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_200522A** Analysis Date: **5/22/2020 5:04:16 PM** Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	217	10.0	200.0	18.04	99.6	90	110			
Fluoride	204	4.00	200.0	0	102	90	110			
Nitrate-N	43.7	5.00	45.16	0	96.7	90	110			
Sulfate	217	30.0	200.0	29.20	94.1	90	110			

Sample ID: **2005196-01CMSD** Batch ID: **96472** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_200522A** Analysis Date: **5/22/2020 5:20:16 PM** Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	217	10.0	200.0	18.04	99.5	90	110	0.065	20	
Fluoride	204	4.00	200.0	0	102	90	110	0.178	20	
Nitrate-N	43.6	5.00	45.16	0	96.6	90	110	0.117	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200522A

Sample ID: **2005196-01CMSD**	Batch ID: **96472**	TestNo: **E300**	Units: **mg/L**		
SampType: **MSD**	Run ID: **IC2_200522A**	Analysis Date: **5/22/2020 5:20:16 PM**	Prep Date: **5/22/2020**		

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	217	30.0	200.0	29.20	93.8	90	110	0.291	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200522A

Sample ID: **ICV-200522**	Batch ID: **R110625**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_200522A**	Analysis Date: **5/22/2020 10:13:35 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	25.2	1.00	25.00	0	101	90	110			
Fluoride	9.88	0.400	10.00	0	98.8	90	110			
Nitrate-N	12.7	0.500	12.50	0	102	90	110			
Sulfate	77.2	3.00	75.00	0	103	90	110			

Sample ID: **CCV1-200522**	Batch ID: **R110625**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200522A**	Analysis Date: **5/22/2020 4:16:16 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.94	1.00	10.00	0	99.4	90	110			
Fluoride	3.84	0.400	4.000	0	95.9	90	110			
Nitrate-N	4.91	0.500	5.000	0	98.2	90	110			
Sulfate	30.3	3.00	30.00	0	101	90	110			

Sample ID: **CCV2-200522**	Batch ID: **R110625**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200522A**	Analysis Date: **5/22/2020 7:44:16 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.85	1.00	10.00	0	98.5	90	110			
Fluoride	3.82	0.400	4.000	0	95.5	90	110			
Nitrate-N	4.89	0.500	5.000	0	97.8	90	110			
Sulfate	29.6	3.00	30.00	0	98.7	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_200601B

The QC data in batch 96589 applies to the following samples: 2005196-01C, 2005196-02C, 2005196-03C, 2005196-04C, 2005196-05C, 2005196-06C, 2005196-07C, 2005196-08C, 2005196-09C, 2005196-10C

Sample ID: **MB-96589** Batch ID: **96589** TestNo: **M2320 B** Units: **mg/L @ pH 4.4**
SampType: **MBLK** Run ID: **TITRATOR_200601B** Analysis Date: **6/1/2020 11:49:00 AM** Prep Date: **6/1/2020**

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-96589** Batch ID: **96589** TestNo: **M2320 B** Units: **mg/L @ pH 4.11**
SampType: **LCS** Run ID: **TITRATOR_200601B** Analysis Date: **6/1/2020 11:53:00 AM** Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	54.9	20.0	50.00	0	110	74	129			

Sample ID: **2005173-01C-DUP** Batch ID: **96589** TestNo: **M2320 B** Units: **mg/L @ pH 4.53**
SampType: **DUP** Run ID: **TITRATOR_200601B** Analysis Date: **6/1/2020 1:47:00 PM** Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	190	20.0	0	196.4				3.05	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)	190	20.0	0	196.4				3.05	20	

Sample ID: **2005196-01C-DUP** Batch ID: **96589** TestNo: **M2320 B** Units: **mg/L @ pH 4.5**
SampType: **DUP** Run ID: **TITRATOR_200601B** Analysis Date: **6/1/2020 5:39:00 PM** Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	129	20.0	0	130.5				1.16	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)	129	20.0	0	130.5				1.16	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_200601B

Sample ID: **ICV-200601**	Batch ID: **R110749**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.33**
SampType: **ICV**	Run ID: **TITRATOR_200601B**	Analysis Date: **6/1/2020 11:47:00 AM**	Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	8.32	20.0	0							
Alkalinity, Carbonate (As CaCO3)	93.3	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	102	20.0	100.0	0	102	98	102			

Sample ID: **CCV1-200601**	Batch ID: **R110749**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.37**
SampType: **CCV**	Run ID: **TITRATOR_200601B**	Analysis Date: **6/1/2020 5:25:00 PM**	Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	43.4	20.0	0							
Alkalinity, Carbonate (As CaCO3)	56.3	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	99.7	20.0	100.0	0	99.7	90	110			

Sample ID: **CCV2-200601**	Batch ID: **R110749**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.3**
SampType: **CCV**	Run ID: **TITRATOR_200601B**	Analysis Date: **6/1/2020 8:30:00 PM**	Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	43.5	20.0	0							
Alkalinity, Carbonate (As CaCO3)	55.5	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: **CCV3-200601**	Batch ID: **R110749**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.36**
SampType: **CCV**	Run ID: **TITRATOR_200601B**	Analysis Date: **6/1/2020 8:48:00 PM**	Prep Date: **6/1/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	37.8	20.0	0							
Alkalinity, Carbonate (As CaCO3)	61.6	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	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: 2005196
Project: A1 Area Landfill-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: 2005196
Project: A1 Area Landfill-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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_200522A

The QC data in batch 96479 applies to the following samples: 2005196-01C, 2005196-02C, 2005196-03C, 2005196-04C, 2005196-05C, 2005196-06C, 2005196-07C, 2005196-08C, 2005196-09C, 2005196-10C

Sample ID: **MB-96479**	Batch ID: **96479**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MBLK**	Run ID: **UV/VIS_2_200522A**	Analysis Date: **5/22/2020 1:50:00 PM**	Prep Date: **5/22/2020**

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

Sample ID: **LCS-96479**	Batch ID: **96479**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **LCS**	Run ID: **UV/VIS_2_200522A**	Analysis Date: **5/22/2020 1:50:00 PM**	Prep Date: **5/22/2020**

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-96479**	Batch ID: **96479**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **LCSD**	Run ID: **UV/VIS_2_200522A**	Analysis Date: **5/22/2020 1:51:00 PM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.512	0.100	0.5000	0	102	80	120	0.195	15	

Sample ID: **2005196-01CMS**	Batch ID: **96479**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MS**	Run ID: **UV/VIS_2_200522A**	Analysis Date: **5/22/2020 1:52:00 PM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.625	0.100	0.5000	0.1210	101	80	120			

Sample ID: **2005196-01CMSD**	Batch ID: **96479**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MSD**	Run ID: **UV/VIS_2_200522A**	Analysis Date: **5/22/2020 1:52:00 PM**	Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.622	0.100	0.5000	0.1210	100	80	120	0.481	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200522A**

Sample ID: **ICV-200522**	Batch ID: **R110612**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_200522A**	Analysis Date: **5/22/2020 1:49:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.203	0.100	0.2000	0	102	85	115			

Sample ID: **CCV1-200522**	Batch ID: **R110612**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200522A**	Analysis Date: **5/22/2020 1:55:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.505	0.100	0.5000	0	101	85	115			

Sample ID: **CCV2-200522**	Batch ID: **R110612**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200522A**	Analysis Date: **5/22/2020 1:56:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.490	0.100	0.5000	0	98.0	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200522C**

The QC data in batch 96483 applies to the following samples: 2005196-01A, 2005196-02A, 2005196-03A, 2005196-04A, 2005196-05A, 2005196-06A, 2005196-07A, 2005196-08A, 2005196-09A, 2005196-10A

Sample ID: **MB-96483** Batch ID: **96483** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **MBLK** Run ID: **UV/VIS_2_200522C** Analysis Date: **5/22/2020 4:39:00 PM** Prep Date: **5/22/2020**

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

Sample ID: **LCS-96483** Batch ID: **96483** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **LCS** Run ID: **UV/VIS_2_200522C** Analysis Date: **5/22/2020 4:40:00 PM** Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0973	0.100	0.1000	0	97.3	85	115			N

Sample ID: **LCSD-96483** Batch ID: **96483** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **LCSD** Run ID: **UV/VIS_2_200522C** Analysis Date: **5/22/2020 4:41:00 PM** Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.102	0.100	0.1000	0	102	85	115	5.07	15	N

Sample ID: **2005173-06AMS** Batch ID: **96483** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **MS** Run ID: **UV/VIS_2_200522C** Analysis Date: **5/22/2020 4:54:00 PM** Prep Date: **5/22/2020**

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

Sample ID: **2005173-06AMSD** Batch ID: **96483** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **MSD** Run ID: **UV/VIS_2_200522C** Analysis Date: **5/22/2020 4:54:00 PM** Prep Date: **5/22/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.109	0.100	0.1000	0	109	85	115	4.88	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: 2005196
Project: A1 Area Landfill-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200522C**

Sample ID: **ICV-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:38:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0997	0.100	0.1000	0	99.7	85	115			N

Sample ID: **CCV1-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:46:00 PM**	Prep Date:

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

Sample ID: **CCV2-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 4:51:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.208	0.100	0.2000	0	104	85	115			N

Sample ID: **CCV3-200522**	Batch ID: **R110699**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200522C**	Analysis Date: **5/22/2020 5:07:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.216	0.100	0.2000	0	108	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: 2005196
Project: A1 Area Landfill-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**
Calcium	0.100	0.300
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	**ng/L @ pH 4.**	**ng/L @ pH 4.**
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

October 27, 2020

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

Order No.: 2010012

RE: A1 Area Landfill-CCR

Dear Will Vienne:

DHL Analytical, Inc. received 14 sample(s) on 10/2/2020 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

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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

№ 69190

CHAIN-OF-CUSTODY

CLIENT: GOLDER
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: 10-1-20 PAGE 1 OF 1
PO #: 19122262 DHL WORK ORDER #: 2010012
PROJECT LOCATION OR NAME:
CLENT PROJECT #: 19122262-D2020 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

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 COBALT ONLY | FIELD NOTES

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	FIELD NOTES
BMW-22	01	9-29-20	0935	W	P	4		X		X	X	X	ND - Sb, Hg, Mo, Tl
BMW-20	02		1030	W	P	4		X		X	X	X	
BMW-21	03		1115	W	P	4		X		X	X	X	
BMW-27	04		1220	W	P	4		X		X	X	X	
BMW-26	05		1325	W	P	4		X		X	X	X	
BMW-24	06		1450	W	P	4		X		X	X	X	
BMW-23	07		1540	W	P	4		X		X	X	X	
BMW-11AR	08		1645	W	P	4		X		X	X	X	
BMW-19	09		1755	W	P	4		X		X	X	X	
BMW-18	10	9-30-20	0755	W	P	4		X		X	X	X	
BMW-28	11		0900	W	P	4		X		X	X	X	
BMW-33	12		1015	W	P	4		X		X	X	X	
DUP-01	13		1015	W	P	4		X		X	X	X	
BMW-32	14		1130	W	P	1	~~4~~ JB	X		X		~~X~~ X	
												Pb, Tl, V	

RELINQUISHED BY: (Signature) DATE/TIME 10-1-20 1630 RECEIVED BY: (Signature) FedEx
RELINQUISHED BY: (Signature) FedEx DATE/TIME 10/2/20 0956 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: 0.2°C / 0.5°C / 1.6°C THERM #: 78
CUSTODY SEALS: ❑ BROKEN ❑ INTACT ☒ NOT USED
CARRIER: ❑ LONE STAR ☒ FEDEX ❑ UPS ❑ OTHER
❑ COURIER DELIVERY
❑ HAND DELIVERED

DHL COC Rev 1 | FEB 2010

Eric Lau

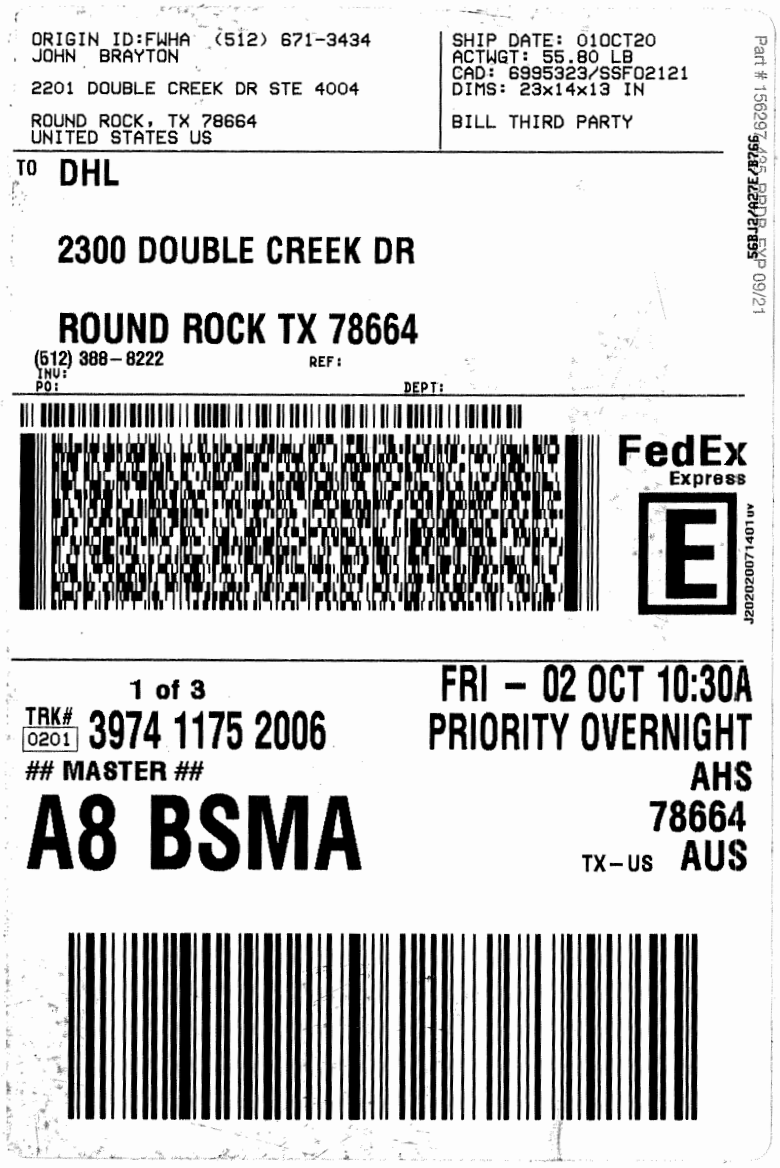
From: John DuPont
Sent: Tuesday, May 28, 2019 11:35 AM
To: Eric Lau
Subject: FW: CCR Analysis

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:FWHA (512) 671-3434
JOHN BRAYTON
2201 DOUBLE CREEK DR STE 4004
ROUND ROCK, TX 78664
UNITED STATES US
SHIP DATE: 01OCT20
ACTWGT: 55.80 LB
CAD: 6995323/SSFO2121
DIMS: 23x14x13 IN
BILL THIRD PARTY
TO DHL
2300 DOUBLE CREEK DR
ROUND ROCK TX 78664
(512) 388-8222
INV:
PO:
REF:
DEPT:
FedEx
Express
1 of 3
TRK# 0201 3974 1175 2006
MASTER
A8 BSMA
FRI - 02 OCT 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS


ORIGIN ID:FWHA (512) 671-3434
JOHN BRAYTON
2201 DOUBLE CREEK DR STE 4004
ROUND ROCK, TX 78664
UNITED STATES US
SHIP DATE: 01OCT20
ACTWGT: 55.80 LB
CAD: 6995323/SSF02121
DIMS: 23x14x13 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 3
MPS# 0263 3974 1175 2017
Mstr# 3974 1175 2006
0201
A8 BSMA
FRI - 02 OCT 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS



ORIGIN ID:FWHA (512) 671-3434
JOHN BRAYTON

2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 01OCT20
ACTWGT: 62.85 LB
CAD: 6995323/SSF02121
DIMS: 23x14x13 IN

BILL THIRD PARTY

Part # 156297-020 RRD REV 09/21

TO DHL

2300 DOUBLE CREEK DR

ROUND ROCK TX 78664

(512) 388-8222 REF:

INV:

PO: DEPT:

FedEx Express

3 of 3

MPS# 0263 3974 1175 2028

Mstr# 3974 1175 2006 0201

FRI - 02 OCT 10:30A
PRIORITY OVERNIGHT

AHS
78664
TX-US AUS

A8 BSMA

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Golder** Date Received: **10/2/2020**

Work Order Number **2010012** Received by: **RA**

Checklist completed by: _____ 10/2/2020 Reviewed by DG 10/2/2020
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 ☐	0.2 °C /0.5/1.6 °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: A1 Area Landfill-CCR	**LRC Date:** 10/27/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2010012
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: A1 Area Landfill-CCR	**LRC Date:** 10/27/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2010012
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

10/27/20

Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *27-Oct-20*

CLIENT: Golder
Project: A1 Area Landfill-CCR
Lab Order: 2010012

CASE NARRATIVE

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

Method SW6020B - Metals 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 10/2/20. A total of 14 samples were received. The samples arrived in good condition and were properly packaged.

Exception Report R7-03

For Metals analysis performed on 10/6/20 the matrix spike and matrix spike duplicate recoveries were below control limits for Boron and/or Calcium. 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: *27-Oct-20*

CLIENT: Golder
Project: A1 Area Landfill-CCR
Lab Order: 2010012

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2010012-01	BMW-22		09/29/20 09:35 AM	10/2/2020
2010012-02	BMW-20		09/29/20 10:30 AM	10/2/2020
2010012-03	BMW-21		09/29/20 11:15 AM	10/2/2020
2010012-04	BMW-27		09/29/20 12:20 PM	10/2/2020
2010012-05	BMW-26		09/29/20 01:25 PM	10/2/2020
2010012-06	BMW-24		09/29/20 02:50 PM	10/2/2020
2010012-07	BMW-23		09/29/20 03:40 PM	10/2/2020
2010012-08	BMW-11AR		09/29/20 04:45 PM	10/2/2020
2010012-09	BMW-19		09/29/20 05:55 PM	10/2/2020
2010012-10	BMW-18		09/30/20 07:55 AM	10/2/2020
2010012-11	BMW-28		09/30/20 09:00 AM	10/2/2020
2010012-12	BMW-33		09/30/20 10:15 AM	10/2/2020
2010012-13	DUP-01		09/30/20 10:15 AM	10/2/2020
2010012-14	BMW-32		09/30/20 11:30 AM	10/2/2020

Lab Order: 2010012
Client: Golder
Project: A1 Area Landfill-CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2010012-01A	BMW-22	09/29/20 09:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-22	09/29/20 09:35 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-01B	BMW-22	09/29/20 09:35 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-22	09/29/20 09:35 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-22	09/29/20 09:35 AM	Aqueous	M2540C	TDS Preparation	10/02/20 09:03 AM	98074
2010012-02A	BMW-20	09/29/20 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-20	09/29/20 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-20	09/29/20 10:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-02B	BMW-20	09/29/20 10:30 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-20	09/29/20 10:30 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-20	09/29/20 10:30 AM	Aqueous	M2540C	TDS Preparation	10/02/20 09:03 AM	98074
2010012-03A	BMW-21	09/29/20 11:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-21	09/29/20 11:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-03B	BMW-21	09/29/20 11:15 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-21	09/29/20 11:15 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-21	09/29/20 11:15 AM	Aqueous	M2540C	TDS Preparation	10/02/20 09:03 AM	98074
2010012-04A	BMW-27	09/29/20 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-27	09/29/20 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-27	09/29/20 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-04B	BMW-27	09/29/20 12:20 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-27	09/29/20 12:20 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-27	09/29/20 12:20 PM	Aqueous	M2540C	TDS Preparation	10/02/20 09:03 AM	98074
2010012-05A	BMW-26	09/29/20 01:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-26	09/29/20 01:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-26	09/29/20 01:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-05B	BMW-26	09/29/20 01:25 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-26	09/29/20 01:25 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-26	09/29/20 01:25 PM	Aqueous	M2540C	TDS Preparation	10/02/20 09:03 AM	98074

Lab Order: 2010012
Client: Golder
Project: A1 Area Landfill-CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2010012-06A	BMW-24	09/29/20 02:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-24	09/29/20 02:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-24	09/29/20 02:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-06B	BMW-24	09/29/20 02:50 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-24	09/29/20 02:50 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-24	09/29/20 02:50 PM	Aqueous	M2540C	TDS Preparation	10/02/20 09:03 AM	98074
2010012-07A	BMW-23	09/29/20 03:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-23	09/29/20 03:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-07B	BMW-23	09/29/20 03:40 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-23	09/29/20 03:40 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-23	09/29/20 03:40 PM	Aqueous	M2540C	TDS Preparation	10/02/20 09:03 AM	98074
2010012-08A	BMW-11AR	09/29/20 04:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-11AR	09/29/20 04:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-11AR	09/29/20 04:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-08B	BMW-11AR	09/29/20 04:45 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-11AR	09/29/20 04:45 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-11AR	09/29/20 04:45 PM	Aqueous	M2540C	TDS Preparation	10/02/20 09:03 AM	98074
2010012-09A	BMW-19	09/29/20 05:55 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-19	09/29/20 05:55 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-19	09/29/20 05:55 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-09B	BMW-19	09/29/20 05:55 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-19	09/29/20 05:55 PM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-19	09/29/20 05:55 PM	Aqueous	M2540C	TDS Preparation	10/02/20 09:03 AM	98074
2010012-10A	BMW-18	09/30/20 07:55 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-18	09/30/20 07:55 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-10B	BMW-18	09/30/20 07:55 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-18	09/30/20 07:55 AM	Aqueous	M2540C	TDS Preparation	10/05/20 12:10 PM	98098
2010012-11A	BMW-28	09/30/20 09:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090

Lab Order: 2010012
Client: Golder
Project: A1 Area Landfill-CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2010012-11A	BMW-28	09/30/20 09:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-28	09/30/20 09:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-11B	BMW-28	09/30/20 09:00 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-28	09/30/20 09:00 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-28	09/30/20 09:00 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-28	09/30/20 09:00 AM	Aqueous	M2540C	TDS Preparation	10/05/20 12:10 PM	98098
2010012-12A	BMW-33	09/30/20 10:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-33	09/30/20 10:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	BMW-33	09/30/20 10:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-12B	BMW-33	09/30/20 10:15 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-33	09/30/20 10:15 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	BMW-33	09/30/20 10:15 AM	Aqueous	M2540C	TDS Preparation	10/05/20 12:10 PM	98098
2010012-13A	DUP-01	09/30/20 10:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	DUP-01	09/30/20 10:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
	DUP-01	09/30/20 10:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090
2010012-13B	DUP-01	09/30/20 10:15 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	DUP-01	09/30/20 10:15 AM	Aqueous	E300	Anion Preparation	10/07/20 10:43 AM	98126
	DUP-01	09/30/20 10:15 AM	Aqueous	M2540C	TDS Preparation	10/05/20 12:10 PM	98098
2010012-14A	BMW-32	09/30/20 11:30 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/05/20 09:27 AM	98090

Lab Order: 2010012
Client: Golder
Project: A1 Area Landfill-CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2010012-01A	BMW-22	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 10:57 AM	ICP-MS5_201006A
	BMW-22	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	20	10/06/20 11:50 AM	ICP-MS4_201006A
2010012-01B	BMW-22	Aqueous	E300	Anions by IC method - Water	98126	10	10/07/20 06:21 PM	IC2_201007A
	BMW-22	Aqueous	E300	Anions by IC method - Water	98126	1	10/07/20 10:53 PM	IC2_201007A
	BMW-22	Aqueous	M2540C	Total Dissolved Solids	98074	1	10/02/20 04:10 PM	WC_201002B
2010012-02A	BMW-20	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	20	10/06/20 11:52 AM	ICP-MS4_201006A
	BMW-20	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 12:47 PM	ICP-MS4_201006A
	BMW-20	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 10:59 AM	ICP-MS5_201006A
2010012-02B	BMW-20	Aqueous	E300	Anions by IC method - Water	98126	10	10/07/20 06:37 PM	IC2_201007A
	BMW-20	Aqueous	E300	Anions by IC method - Water	98126	1	10/07/20 11:09 PM	IC2_201007A
	BMW-20	Aqueous	M2540C	Total Dissolved Solids	98074	1	10/02/20 04:10 PM	WC_201002B
2010012-03A	BMW-21	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	10	10/06/20 11:54 AM	ICP-MS4_201006A
	BMW-21	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 11:01 AM	ICP-MS5_201006A
2010012-03B	BMW-21	Aqueous	E300	Anions by IC method - Water	98126	10	10/07/20 06:53 PM	IC2_201007A
	BMW-21	Aqueous	E300	Anions by IC method - Water	98126	1	10/08/20 12:45 AM	IC2_201007A
	BMW-21	Aqueous	M2540C	Total Dissolved Solids	98074	1	10/02/20 04:10 PM	WC_201002B
2010012-04A	BMW-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 11:03 AM	ICP-MS5_201006A
	BMW-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	2	10/06/20 12:49 PM	ICP-MS4_201006A
	BMW-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	20	10/06/20 11:56 AM	ICP-MS4_201006A
2010012-04B	BMW-27	Aqueous	E300	Anions by IC method - Water	98126	1	10/08/20 01:01 AM	IC2_201007A
	BMW-27	Aqueous	E300	Anions by IC method - Water	98126	10	10/07/20 07:09 PM	IC2_201007A
	BMW-27	Aqueous	M2540C	Total Dissolved Solids	98074	1	10/02/20 04:10 PM	WC_201002B
2010012-05A	BMW-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	20	10/06/20 11:46 AM	ICP-MS4_201006A
	BMW-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	5	10/06/20 12:38 PM	ICP-MS4_201006A
	BMW-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 10:52 AM	ICP-MS5_201006A
2010012-05B	BMW-26	Aqueous	E300	Anions by IC method - Water	98126	1	10/08/20 01:17 AM	IC2_201007A
	BMW-26	Aqueous	E300	Anions by IC method - Water	98126	10	10/07/20 08:45 PM	IC2_201007A
	BMW-26	Aqueous	M2540C	Total Dissolved Solids	98074	1	10/02/20 04:10 PM	WC_201002B

Lab Order: 2010012
Client: Golder
Project: A1 Area Landfill-CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2010012-06A	BMW-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 12:51 PM	ICP-MS4_201006A
	BMW-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 11:06 AM	ICP-MS5_201006A
	BMW-24	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	10	10/06/20 11:58 AM	ICP-MS4_201006A
2010012-06B	BMW-24	Aqueous	E300	Anions by IC method - Water	98126	10	10/07/20 09:01 PM	IC2_201007A
	BMW-24	Aqueous	E300	Anions by IC method - Water	98126	1	10/08/20 01:33 AM	IC2_201007A
	BMW-24	Aqueous	M2540C	Total Dissolved Solids	98074	1	10/02/20 04:10 PM	WC_201002B
2010012-07A	BMW-23	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	10	10/06/20 12:00 PM	ICP-MS4_201006A
	BMW-23	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 11:08 AM	ICP-MS5_201006A
2010012-07B	BMW-23	Aqueous	E300	Anions by IC method - Water	98126	1	10/08/20 01:49 AM	IC2_201007A
	BMW-23	Aqueous	E300	Anions by IC method - Water	98126	10	10/07/20 09:17 PM	IC2_201007A
	BMW-23	Aqueous	M2540C	Total Dissolved Solids	98074	1	10/02/20 04:10 PM	WC_201002B
2010012-08A	BMW-11AR	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	10	10/06/20 12:02 PM	ICP-MS4_201006A
	BMW-11AR	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 12:53 PM	ICP-MS4_201006A
	BMW-11AR	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 11:10 AM	ICP-MS5_201006A
2010012-08B	BMW-11AR	Aqueous	E300	Anions by IC method - Water	98126	10	10/07/20 09:33 PM	IC2_201007A
	BMW-11AR	Aqueous	E300	Anions by IC method - Water	98126	1	10/08/20 02:05 AM	IC2_201007A
	BMW-11AR	Aqueous	M2540C	Total Dissolved Solids	98074	1	10/02/20 04:10 PM	WC_201002B
2010012-09A	BMW-19	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	50	10/06/20 12:04 PM	ICP-MS4_201006A
	BMW-19	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	2	10/06/20 12:55 PM	ICP-MS4_201006A
	BMW-19	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 11:12 AM	ICP-MS5_201006A
2010012-09B	BMW-19	Aqueous	E300	Anions by IC method - Water	98126	100	10/07/20 04:29 PM	IC2_201007A
	BMW-19	Aqueous	E300	Anions by IC method - Water	98126	1	10/08/20 02:21 AM	IC2_201007A
	BMW-19	Aqueous	M2540C	Total Dissolved Solids	98074	1	10/02/20 04:10 PM	WC_201002B
2010012-10A	BMW-18	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	2	10/06/20 12:06 PM	ICP-MS4_201006A
	BMW-18	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 11:14 AM	ICP-MS5_201006A
2010012-10B	BMW-18	Aqueous	E300	Anions by IC method - Water	98126	1	10/08/20 02:37 AM	IC2_201007A
	BMW-18	Aqueous	M2540C	Total Dissolved Solids	98098	1	10/05/20 04:45 PM	WC_201005B
2010012-11A	BMW-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	10	10/06/20 12:17 PM	ICP-MS4_201006A

Lab Order: 2010012
Client: Golder
Project: A1 Area Landfill-CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2010012-11A	BMW-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 11:32 AM	ICP-MS5_201006A
	BMW-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	2	10/06/20 12:57 PM	ICP-MS4_201006A
2010012-11B	BMW-28	Aqueous	E300	Anions by IC method - Water	98126	100	10/07/20 05:17 PM	IC2_201007A
	BMW-28	Aqueous	E300	Anions by IC method - Water	98126	10	10/07/20 09:49 PM	IC2_201007A
	BMW-28	Aqueous	E300	Anions by IC method - Water	98126	1	10/08/20 05:01 AM	IC2_201007A
	BMW-28	Aqueous	M2540C	Total Dissolved Solids	98098	1	10/05/20 04:45 PM	WC_201005B
2010012-12A	BMW-33	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 11:35 AM	ICP-MS5_201006A
	BMW-33	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	10	10/06/20 12:19 PM	ICP-MS4_201006A
	BMW-33	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 12:59 PM	ICP-MS4_201006A
2010012-12B	BMW-33	Aqueous	E300	Anions by IC method - Water	98126	10	10/07/20 10:05 PM	IC2_201007A
	BMW-33	Aqueous	E300	Anions by IC method - Water	98126	1	10/08/20 02:53 AM	IC2_201007A
	BMW-33	Aqueous	M2540C	Total Dissolved Solids	98098	1	10/05/20 04:45 PM	WC_201005B
2010012-13A	DUP-01	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	10	10/06/20 12:21 PM	ICP-MS4_201006A
	DUP-01	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 01:00 PM	ICP-MS4_201006A
	DUP-01	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 11:37 AM	ICP-MS5_201006A
2010012-13B	DUP-01	Aqueous	E300	Anions by IC method - Water	98126	10	10/07/20 10:21 PM	IC2_201007A
	DUP-01	Aqueous	E300	Anions by IC method - Water	98126	1	10/08/20 03:09 AM	IC2_201007A
	DUP-01	Aqueous	M2540C	Total Dissolved Solids	98098	1	10/05/20 04:45 PM	WC_201005B
2010012-14A	BMW-32	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98090	1	10/06/20 11:39 AM	ICP-MS5_201006A

DHL Analytical, Inc.

Date: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-22
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-01
Project No:	19122262-D2020	**Collection Date:**	09/29/20 09:35 AM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 10:57 AM
Barium	0.0598	0.00300	0.0100		mg/L	1	10/06/20 10:57 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 10:57 AM
Boron	3.49	0.200	0.600		mg/L	20	10/06/20 11:50 AM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 10:57 AM
Calcium	223	2.00	6.00		mg/L	20	10/06/20 11:50 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 10:57 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	10/06/20 10:57 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 10:57 AM
Lithium	0.0837	0.00500	0.0100		mg/L	1	10/06/20 10:57 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 10:57 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	281	3.00	10.0		mg/L	10	10/07/20 06:21 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/07/20 10:53 PM
Sulfate	855	10.0	30.0		mg/L	10	10/07/20 06:21 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2280	50.0	50.0		mg/L	1	10/02/20 04:10 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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-20
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-02
Project No:	19122262-D2020	**Collection Date:**	09/29/20 10:30 AM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	0.00837	0.00200	0.00500		mg/L	1	10/06/20 10:59 AM
Barium	0.0292	0.00300	0.0100		mg/L	1	10/06/20 10:59 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 10:59 AM
Boron	0.111	0.0100	0.0300		mg/L	1	10/06/20 12:47 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 10:59 AM
Calcium	143	2.00	6.00		mg/L	20	10/06/20 11:52 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 10:59 AM
Cobalt	0.101	0.00300	0.00500		mg/L	1	10/06/20 10:59 AM
Lead	0.00159	0.000300	0.00100		mg/L	1	10/06/20 10:59 AM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	10/06/20 10:59 AM
Selenium	0.00204	0.00200	0.00500	J	mg/L	1	10/06/20 10:59 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	46.3	0.300	1.00		mg/L	1	10/07/20 11:09 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/07/20 11:09 PM
Sulfate	966	10.0	30.0		mg/L	10	10/07/20 06:37 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1540	50.0	50.0		mg/L	1	10/02/20 04:10 PM

Qualifiers:

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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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-21
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-03
Project No:	19122262-D2020	**Collection Date:**	09/29/20 11:15 AM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	0.00814	0.00200	0.00500		mg/L	1	10/06/20 11:01 AM
Barium	0.0420	0.00300	0.0100		mg/L	1	10/06/20 11:01 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:01 AM
Boron	1.00	0.100	0.300		mg/L	10	10/06/20 11:54 AM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:01 AM
Calcium	161	1.00	3.00		mg/L	10	10/06/20 11:54 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:01 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	10/06/20 11:01 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:01 AM
Lithium	0.0663	0.00500	0.0100		mg/L	1	10/06/20 11:01 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:01 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	415	3.00	10.0		mg/L	10	10/07/20 06:53 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/08/20 12:45 AM
Sulfate	444	10.0	30.0		mg/L	10	10/07/20 06:53 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2030	50.0	50.0		mg/L	1	10/02/20 04:10 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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-27
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-04
Project No:	19122262-D2020	**Collection Date:**	09/29/20 12:20 PM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	0.00494	0.00200	0.00500	J	mg/L	1	10/06/20 11:03 AM
Barium	0.0313	0.00300	0.0100		mg/L	1	10/06/20 11:03 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:03 AM
Boron	0.464	0.0200	0.0600		mg/L	2	10/06/20 12:49 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:03 AM
Calcium	268	2.00	6.00		mg/L	20	10/06/20 11:56 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:03 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	10/06/20 11:03 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:03 AM
Lithium	0.110	0.00500	0.0100		mg/L	1	10/06/20 11:03 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:03 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	134	3.00	10.0		mg/L	10	10/07/20 07:09 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/08/20 01:01 AM
Sulfate	704	10.0	30.0		mg/L	10	10/07/20 07:09 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2130	50.0	50.0		mg/L	1	10/02/20 04:10 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
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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-26
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-05
Project No:	19122262-D2020	**Collection Date:**	09/29/20 01:25 PM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	0.00466	0.00200	0.00500	J	mg/L	1	10/06/20 10:52 AM
Barium	0.0314	0.00300	0.0100		mg/L	1	10/06/20 10:52 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 10:52 AM
Boron	0.522	0.0500	0.150		mg/L	5	10/06/20 12:38 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 10:52 AM
Calcium	265	2.00	6.00		mg/L	20	10/06/20 11:46 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 10:52 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	10/06/20 10:52 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 10:52 AM
Lithium	0.107	0.00500	0.0100		mg/L	1	10/06/20 10:52 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 10:52 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	130	3.00	10.0		mg/L	10	10/07/20 08:45 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/08/20 01:17 AM
Sulfate	703	10.0	30.0		mg/L	10	10/07/20 08:45 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2140	50.0	50.0		mg/L	1	10/02/20 04:10 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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-24
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-06
Project No:	19122262-D2020	**Collection Date:**	09/29/20 02:50 PM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:06 AM
Barium	1.85	0.00300	0.0100		mg/L	1	10/06/20 11:06 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:06 AM
Boron	0.205	0.0100	0.0300		mg/L	1	10/06/20 12:51 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:06 AM
Calcium	58.8	1.00	3.00		mg/L	10	10/06/20 11:58 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:06 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	10/06/20 11:06 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:06 AM
Lithium	0.00563	0.00500	0.0100	J	mg/L	1	10/06/20 11:06 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:06 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	482	3.00	10.0		mg/L	10	10/07/20 09:01 PM
Fluoride	0.725	0.100	0.400		mg/L	1	10/08/20 01:33 AM
Sulfate	4.48	1.00	3.00		mg/L	1	10/08/20 01:33 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1000	50.0	50.0		mg/L	1	10/02/20 04:10 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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-23
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-07
Project No:	19122262-D2020	**Collection Date:**	09/29/20 03:40 PM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:08 AM
Barium	0.0383	0.00300	0.0100		mg/L	1	10/06/20 11:08 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:08 AM
Boron	1.42	0.100	0.300		mg/L	10	10/06/20 12:00 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:08 AM
Calcium	102	1.00	3.00		mg/L	10	10/06/20 12:00 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:08 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	10/06/20 11:08 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:08 AM
Lithium	0.0861	0.00500	0.0100		mg/L	1	10/06/20 11:08 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:08 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	238	3.00	10.0		mg/L	10	10/07/20 09:17 PM
Fluoride	0.302	0.100	0.400	J	mg/L	1	10/08/20 01:49 AM
Sulfate	443	10.0	30.0		mg/L	10	10/07/20 09:17 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1590	50.0	50.0		mg/L	1	10/02/20 04:10 PM

Qualifiers:

- ND - Not Detected at the SDL
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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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-11AR
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-08
Project No:	19122262-D2020	**Collection Date:**	09/29/20 04:45 PM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	0.0102	0.00200	0.00500		mg/L	1	10/06/20 11:10 AM
Barium	0.0517	0.00300	0.0100		mg/L	1	10/06/20 11:10 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:10 AM
Boron	0.349	0.0100	0.0300		mg/L	1	10/06/20 12:53 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:10 AM
Calcium	148	1.00	3.00		mg/L	10	10/06/20 12:02 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:10 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	10/06/20 11:10 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:10 AM
Lithium	0.0337	0.00500	0.0100		mg/L	1	10/06/20 11:10 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:10 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	6.37	0.300	1.00		mg/L	1	10/08/20 02:05 AM
Fluoride	0.408	0.100	0.400		mg/L	1	10/08/20 02:05 AM
Sulfate	275	10.0	30.0		mg/L	10	10/07/20 09:33 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1240	10.0	10.0		mg/L	1	10/02/20 04:10 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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-19
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-09
Project No:	19122262-D2020	**Collection Date:**	09/29/20 05:55 PM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:12 AM
Barium	0.0137	0.00300	0.0100		mg/L	1	10/06/20 11:12 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:12 AM
Boron	0.460	0.0200	0.0600		mg/L	2	10/06/20 12:55 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:12 AM
Calcium	484	5.00	15.0		mg/L	50	10/06/20 12:04 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:12 AM
Cobalt	0.0187	0.00300	0.00500		mg/L	1	10/06/20 11:12 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:12 AM
Lithium	0.0742	0.00500	0.0100		mg/L	1	10/06/20 11:12 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:12 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	5.39	0.300	1.00		mg/L	1	10/08/20 02:21 AM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/08/20 02:21 AM
Sulfate	1790	100	300		mg/L	100	10/07/20 04:29 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3480	50.0	50.0		mg/L	1	10/02/20 04:10 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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-18
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-10
Project No:	19122262-D2020	**Collection Date:**	09/30/20 07:55 AM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:14 AM
Barium	0.0315	0.00300	0.0100		mg/L	1	10/06/20 11:14 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:14 AM
Boron	0.447	0.0200	0.0600		mg/L	2	10/06/20 12:06 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:14 AM
Calcium	6.62	0.100	0.300		mg/L	1	10/06/20 11:14 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:14 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	10/06/20 11:14 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:14 AM
Lithium	0.0193	0.00500	0.0100		mg/L	1	10/06/20 11:14 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:14 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	19.0	0.300	1.00		mg/L	1	10/08/20 02:37 AM
Fluoride	0.387	0.100	0.400	J	mg/L	1	10/08/20 02:37 AM
Sulfate	81.1	1.00	3.00		mg/L	1	10/08/20 02:37 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	469	10.0	10.0		mg/L	1	10/05/20 04:45 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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-28
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-11
Project No:	19122262-D2020	**Collection Date:**	09/30/20 09:00 AM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:32 AM
Barium	0.0150	0.00300	0.0100		mg/L	1	10/06/20 11:32 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:32 AM
Boron	0.612	0.0200	0.0600		mg/L	2	10/06/20 12:57 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:32 AM
Calcium	149	1.00	3.00		mg/L	10	10/06/20 12:17 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:32 AM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	10/06/20 11:32 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:32 AM
Lithium	0.0953	0.00500	0.0100		mg/L	1	10/06/20 11:32 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:32 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	51.1	3.00	10.0		mg/L	10	10/07/20 09:49 PM
Fluoride	0.229	0.100	0.400	J	mg/L	1	10/08/20 05:01 AM
Sulfate	1030	10.0	30.0		mg/L	10	10/07/20 09:49 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2100	50.0	50.0		mg/L	1	10/05/20 04:45 PM

Qualifiers:

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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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-33
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-12
Project No:	19122262-D2020	**Collection Date:**	09/30/20 10:15 AM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:35 AM
Barium	0.166	0.00300	0.0100		mg/L	1	10/06/20 11:35 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:35 AM
Boron	0.228	0.0100	0.0300		mg/L	1	10/06/20 12:59 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:35 AM
Calcium	131	1.00	3.00		mg/L	10	10/06/20 12:19 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:35 AM
Cobalt	0.00826	0.00300	0.00500		mg/L	1	10/06/20 11:35 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:35 AM
Lithium	0.0135	0.00500	0.0100		mg/L	1	10/06/20 11:35 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:35 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	60.9	3.00	10.0		mg/L	10	10/07/20 10:05 PM
Fluoride	0.410	0.100	0.400		mg/L	1	10/08/20 02:53 AM
Sulfate	184	10.0	30.0		mg/L	10	10/07/20 10:05 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1000	50.0	50.0		mg/L	1	10/05/20 04:45 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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	DUP-01
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-13
Project No:	19122262-D2020	**Collection Date:**	09/30/20 10:15 AM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Arsenic	0.00424	0.00200	0.00500	J	mg/L	1	10/06/20 11:37 AM
Barium	0.159	0.00300	0.0100		mg/L	1	10/06/20 11:37 AM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:37 AM
Boron	0.218	0.0100	0.0300		mg/L	1	10/06/20 01:00 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:37 AM
Calcium	135	1.00	3.00		mg/L	10	10/06/20 12:21 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:37 AM
Cobalt	0.00941	0.00300	0.00500		mg/L	1	10/06/20 11:37 AM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/06/20 11:37 AM
Lithium	0.0124	0.00500	0.0100		mg/L	1	10/06/20 11:37 AM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/06/20 11:37 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	65.4	3.00	10.0		mg/L	10	10/07/20 10:21 PM
Fluoride	0.894	0.100	0.400		mg/L	1	10/08/20 03:09 AM
Sulfate	179	10.0	30.0		mg/L	10	10/07/20 10:21 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1020	50.0	50.0		mg/L	1	10/05/20 04:45 PM

Qualifiers:

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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: *27-Oct-20*

CLIENT:	Golder	**Client Sample ID:**	BMW-32
Project:	A1 Area Landfill-CCR	**Lab ID:**	2010012-14
Project No:	19122262-D2020	**Collection Date:**	09/30/20 11:30 AM
Lab Order:	2010012	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Cobalt	0.00408	0.00300	0.00500	J	mg/L	1	10/06/20 11:39 AM

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

CLIENT: Golder
Work Order: 2010012
Project: A1 Area Landfill-CCR

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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_201006A

The QC data in batch 98090 applies to the following samples: 2010012-01A, 2010012-02A, 2010012-03A, 2010012-04A, 2010012-05A, 2010012-06A, 2010012-07A, 2010012-08A, 2010012-09A, 2010012-10A, 2010012-11A, 2010012-12A, 2010012-13A, 2010012-14A

Sample ID: **MB-98090** Batch ID: **98090** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_201006A** Analysis Date: **10/6/2020 11:38:00 AM** Prep Date: **10/5/2020**

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

Sample ID: **LCS-98090** Batch ID: **98090** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_201006A** Analysis Date: **10/6/2020 11:40:00 AM** Prep Date: **10/5/2020**

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

Sample ID: **LCSD-98090** Batch ID: **98090** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_201006A** Analysis Date: **10/6/2020 11:42:00 AM** Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.197	0.0300	0.200	0	98.6	80	120	2.07	15	

Sample ID: **2010012-05A SD** Batch ID: **98090** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_201006A** Analysis Date: **10/6/2020 11:48:00 AM** Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	261	30.0	0	265				1.28	20	

Sample ID: **2010012-05A PDS** Batch ID: **98090** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_201006A** Analysis Date: **10/6/2020 12:08:00 PM** Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	362	6.00	100	265	97.9	75	125			

Sample ID: **2010012-05A SD** Batch ID: **98090** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_201006A** Analysis Date: **10/6/2020 12:45:00 PM** Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.562	0.750	0	0.522				7.41	20	

Sample ID: **2010012-05A PDS** Batch ID: **98090** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_201006A** Analysis Date: **10/6/2020 1:04:00 PM** Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.58	0.150	1.00	0.522	106	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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_201006A

Sample ID: **2010012-05A MS**	Batch ID: **98090**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_201006A**	Analysis Date: **10/6/2020 1:07:00 PM**	Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.666	0.150	0.200	0.522	72.0	75	125			S

Sample ID: **2010012-05A MSD**	Batch ID: **98090**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_201006A**	Analysis Date: **10/6/2020 1:09:00 PM**	Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.682	0.150	0.200	0.522	80.2	75	125	2.42	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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_201006A

Sample ID: **ICV-201006**	Batch ID: **R112525**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_201006A**	Analysis Date: **10/6/2020 10:53:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0916	0.0300	0.100	0	91.6	90	110			
Calcium	2.58	0.300	2.50	0	103	90	110			

Sample ID: **LCVL-201006**	Batch ID: **R112525**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_201006A**	Analysis Date: **10/6/2020 11:03:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0221	0.0300	0.0200	0	111	80	120			
Calcium	0.101	0.300	0.100	0	101	80	120			

Sample ID: **CCV1-201006**	Batch ID: **R112525**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_201006A**	Analysis Date: **10/6/2020 12:12:00 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	5.06	0.300	5.00	0	101	90	110			

Sample ID: **CCV2-201006**	Batch ID: **R112525**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_201006A**	Analysis Date: **10/6/2020 12:34:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.203	0.0300	0.200	0	101	90	110			
Calcium	5.28	0.300	5.00	0	106	90	110			

Sample ID: **CCV3-201006**	Batch ID: **R112525**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_201006A**	Analysis Date: **10/6/2020 1:11:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.194	0.0300	0.200	0	97.1	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: 2010012
Project: A1 Area Landfill-CCR

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
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	

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	
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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_201006A

The QC data in batch 98090 applies to the following samples: 2010012-01A, 2010012-02A, 2010012-03A, 2010012-04A, 2010012-05A, 2010012-06A, 2010012-07A, 2010012-08A, 2010012-09A, 2010012-10A, 2010012-11A, 2010012-12A, 2010012-13A, 2010012-14A

Sample ID: **MB-98090** Batch ID: **98090** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_201006A** Analysis Date: **10/6/2020 10:44:00 AM** Prep Date: **10/5/2020**

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

Sample ID: **LCS-98090** Batch ID: **98090** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_201006A** Analysis Date: **10/6/2020 10:46:00 AM** Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.197	0.00500	0.200	0	98.4	80	120			
Barium	0.198	0.0100	0.200	0	99.0	80	120			
Beryllium	0.196	0.00100	0.200	0	98.1	80	120			
Cadmium	0.195	0.00100	0.200	0	97.3	80	120			
Calcium	5.01	0.300	5.00	0	100	80	120			
Chromium	0.194	0.00500	0.200	0	96.8	80	120			
Cobalt	0.195	0.00500	0.200	0	97.6	80	120			
Lead	0.194	0.00100	0.200	0	97.0	80	120			
Lithium	0.199	0.0100	0.200	0	99.6	80	120			
Selenium	0.198	0.00500	0.200	0	99.1	80	120			

Sample ID: **LCSD-98090** Batch ID: **98090** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_201006A** Analysis Date: **10/6/2020 10:48:00 AM** Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.197	0.00500	0.200	0	98.3	80	120	0.164	15	
Barium	0.199	0.0100	0.200	0	99.7	80	120	0.747	15	
Beryllium	0.197	0.00100	0.200	0	98.4	80	120	0.363	15	
Cadmium	0.195	0.00100	0.200	0	97.7	80	120	0.404	15	
Calcium	4.93	0.300	5.00	0	98.6	80	120	1.65	15	
Chromium	0.194	0.00500	0.200	0	96.9	80	120	0.154	15	
Cobalt	0.193	0.00500	0.200	0	96.5	80	120	1.07	15	
Lead	0.194	0.00100	0.200	0	96.8	80	120	0.201	15	
Lithium	0.203	0.0100	0.200	0	101	80	120	1.77	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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_201006A

Sample ID: **LCSD-98090**	Batch ID: **98090**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS5_201006A**	Analysis Date: **10/6/2020 10:48:00 AM**	Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	0.198	0.00500	0.200	0	99.0	80	120	0.135	15	

Sample ID: **2010012-05A SD**	Batch ID: **98090**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS5_201006A**	Analysis Date: **10/6/2020 10:55:00 AM**	Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	<0.0100	0.0250	0	0.00466				0	20	
Barium	0.0318	0.0500	0	0.0314				1.37	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	<0.0150	0.0250	0	0				0	20	
Lead	<0.00150	0.00500	0	0				0	20	
Lithium	0.109	0.0500	0	0.107				1.84	20	
Selenium	<0.0100	0.0250	0	0				0	20	

Sample ID: **2010012-05A PDS**	Batch ID: **98090**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS5_201006A**	Analysis Date: **10/6/2020 11:17:00 AM**	Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.197	0.00500	0.200	0.00466	96.0	75	125			
Barium	0.240	0.0100	0.200	0.0314	104	75	125			
Beryllium	0.198	0.00100	0.200	0	99.2	75	125			
Cadmium	0.197	0.00100	0.200	0	98.3	75	125			
Chromium	0.202	0.00500	0.200	0	101	75	125			
Cobalt	0.191	0.00500	0.200	0	95.6	75	125			
Lead	0.206	0.00100	0.200	0	103	75	125			
Lithium	0.307	0.0100	0.200	0.107	100	75	125			
Selenium	0.184	0.00500	0.200	0	91.9	75	125			

Sample ID: **2010012-05A MS**	Batch ID: **98090**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_201006A**	Analysis Date: **10/6/2020 11:22:00 AM**	Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.193	0.00500	0.200	0.00466	93.9	75	125			
Barium	0.230	0.0100	0.200	0.0314	99.1	75	125			
Beryllium	0.195	0.00100	0.200	0	97.5	75	125			
Cadmium	0.187	0.00100	0.200	0	93.5	75	125			
Calcium	256	0.300	5.00	253	41.9	75	125			S
Chromium	0.190	0.00500	0.200	0	95.1	75	125			
Cobalt	0.181	0.00500	0.200	0	90.3	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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_201006A

Sample ID: **2010012-05A MS**	Batch ID: **98090**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_201006A**	Analysis Date: **10/6/2020 11:22:00 AM**	Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	0.195	0.00100	0.200	0	97.7	75	125			
Lithium	0.309	0.0100	0.200	0.107	101	75	125			
Selenium	0.174	0.00500	0.200	0	86.9	75	125			

Sample ID: **2010012-05A MSD**	Batch ID: **98090**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_201006A**	Analysis Date: **10/6/2020 11:24:00 AM**	Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.193	0.00500	0.200	0.00466	94.4	75	125	0.424	15	
Barium	0.233	0.0100	0.200	0.0314	101	75	125	1.52	15	
Beryllium	0.196	0.00100	0.200	0	97.8	75	125	0.316	15	
Cadmium	0.188	0.00100	0.200	0	94.1	75	125	0.638	15	
Calcium	255	0.300	5.00	253	39.9	75	125	0.039	15	S
Chromium	0.189	0.00500	0.200	0	94.5	75	125	0.652	15	
Cobalt	0.183	0.00500	0.200	0	91.4	75	125	1.17	15	
Lead	0.196	0.00100	0.200	0	97.8	75	125	0.115	15	
Lithium	0.308	0.0100	0.200	0.107	101	75	125	0.325	15	
Selenium	0.175	0.00500	0.200	0	87.3	75	125	0.414	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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_201006A

Sample ID: **ICV-201006** Batch ID: **R112544** TestNo: **SW6020B** Units: **mg/L**
SampType: **ICV** Run ID: **ICP-MS5_201006A** Analysis Date: **10/6/2020 10:25:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.0973	0.00500	0.100	0	97.3	90	110			
Barium	0.0984	0.0100	0.100	0	98.4	90	110			
Beryllium	0.0966	0.00100	0.100	0	96.6	90	110			
Cadmium	0.0995	0.00100	0.100	0	99.5	90	110			
Calcium	2.48	0.300	2.50	0	99.2	90	110			
Chromium	0.0998	0.00500	0.100	0	99.8	90	110			
Cobalt	0.0979	0.00500	0.100	0	97.9	90	110			
Lead	0.0976	0.00100	0.100	0	97.6	90	110			
Lithium	0.0964	0.0100	0.100	0	96.4	90	110			
Selenium	0.0972	0.00500	0.100	0	97.2	90	110			

Sample ID: **LCVL-201006** Batch ID: **R112544** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS5_201006A** Analysis Date: **10/6/2020 10:36:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00479	0.00500	0.00500	0	95.9	80	120			
Barium	0.00534	0.0100	0.00500	0	107	80	120			
Beryllium	0.00103	0.00100	0.00100	0	103	80	120			
Cadmium	0.000990	0.00100	0.00100	0	99.0	80	120			
Calcium	0.0942	0.300	0.100	0	94.2	80	120			
Chromium	0.00480	0.00500	0.00500	0	95.9	80	120			
Cobalt	0.00500	0.00500	0.00500	0	100	80	120			
Lead	0.000818	0.00100	0.00100	0	81.8	80	120			
Lithium	0.00990	0.0100	0.0100	0	99.0	80	120			
Selenium	0.00554	0.00500	0.00500	0	111	80	120			

Sample ID: **CCV1-201006** Batch ID: **R112544** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_201006A** Analysis Date: **10/6/2020 11:26:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.202	0.00500	0.200	0	101	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	0.198	0.00100	0.200	0	98.9	90	110			
Calcium	4.97	0.300	5.00	0	99.5	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	0.196	0.00100	0.200	0	97.9	90	110			
Lithium	0.205	0.0100	0.200	0	103	90	110			
Selenium	0.203	0.00500	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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_201006A

Sample ID: **CCV2-201006** Batch ID: **R112544** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_201006A** Analysis Date: **10/6/2020 11:53:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.200	0.00500	0.200	0	99.9	90	110			
Barium	0.202	0.0100	0.200	0	101	90	110			
Beryllium	0.199	0.00100	0.200	0	99.5	90	110			
Cadmium	0.197	0.00100	0.200	0	98.3	90	110			
Calcium	4.93	0.300	5.00	0	98.6	90	110			
Chromium	0.194	0.00500	0.200	0	97.2	90	110			
Cobalt	0.196	0.00500	0.200	0	98.2	90	110			
Lead	0.194	0.00100	0.200	0	96.9	90	110			
Lithium	0.204	0.0100	0.200	0	102	90	110			
Selenium	0.200	0.00500	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: 2010012
Project: A1 Area Landfill-CCR

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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_201007A

The QC data in batch 98126 applies to the following samples: 2010012-01B, 2010012-02B, 2010012-03B, 2010012-04B, 2010012-05B, 2010012-06B, 2010012-07B, 2010012-08B, 2010012-09B, 2010012-10B, 2010012-11B, 2010012-12B, 2010012-13B

Sample ID: **MB-98126** Batch ID: **98126** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_201007A** Analysis Date: **10/7/2020 12:41:05 PM** Prep Date: **10/7/2020**

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-98126** Batch ID: **98126** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_201007A** Analysis Date: **10/7/2020 12:57:05 PM** Prep Date: **10/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.73	1.00	10.00	0	97.3	90	110			
Fluoride	3.89	0.400	4.000	0	97.2	90	110			
Sulfate	28.5	3.00	30.00	0	95.1	90	110			

Sample ID: **LCSD-98126** Batch ID: **98126** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_201007A** Analysis Date: **10/7/2020 1:13:05 PM** Prep Date: **10/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.72	1.00	10.00	0	97.2	90	110	0.123	20	
Fluoride	3.88	0.400	4.000	0	97.0	90	110	0.126	20	
Sulfate	28.7	3.00	30.00	0	95.6	90	110	0.449	20	

Sample ID: **2010035-01CMS** Batch ID: **98126** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_201007A** Analysis Date: **10/7/2020 3:57:29 PM** Prep Date: **10/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	33700	1000	20000	14670	95.3	90	110			
Fluoride	19700	400	20000	0	98.4	90	110			
Sulfate	20800	3000	20000	2399	92.1	90	110			

Sample ID: **2010035-01CMSD** Batch ID: **98126** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_201007A** Analysis Date: **10/7/2020 4:13:29 PM** Prep Date: **10/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	33600	1000	20000	14670	94.6	90	110	0.373	20	
Fluoride	19700	400	20000	0	98.7	90	110	0.305	20	
Sulfate	20700	3000	20000	2399	91.7	90	110	0.393	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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_201007A

Sample ID: **2010012-09BMS**	Batch ID: **98126**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_201007A**	Analysis Date: **10/7/2020 4:45:29 PM**	Prep Date: **10/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	1970	100	2000	0	98.5	90	110			
Fluoride	1960	40.0	2000	0	97.8	90	110			
Sulfate	3680	300	2000	1788	94.8	90	110			

Sample ID: **2010012-09BMSD**	Batch ID: **98126**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_201007A**	Analysis Date: **10/7/2020 5:01:29 PM**	Prep Date: **10/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	1980	100	2000	0	99.1	90	110	0.605	20	
Fluoride	1970	40.0	2000	0	98.5	90	110	0.754	20	
Sulfate	3690	300	2000	1788	95.1	90	110	0.198	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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_201007A

Sample ID: **ICV-201007**	Batch ID: **R112565**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_201007A**	Analysis Date: **10/7/2020 12:09:05 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.9	1.00	25.00	0	99.8	90	110			
Fluoride	9.97	0.400	10.00	0	99.7	90	110			
Sulfate	74.4	3.00	75.00	0	99.2	90	110			

Sample ID: **CCV1-201007**	Batch ID: **R112565**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_201007A**	Analysis Date: **10/7/2020 8:13:29 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.74	1.00	10.00	0	97.4	90	110			
Fluoride	4.00	0.400	4.000	0	100	90	110			
Sulfate	28.7	3.00	30.00	0	95.8	90	110			

Sample ID: **CCV2-201007**	Batch ID: **R112565**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_201007A**	Analysis Date: **10/8/2020 12:13:29 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.80	1.00	10.00	0	98.0	90	110			
Fluoride	4.02	0.400	4.000	0	101	90	110			
Sulfate	28.9	3.00	30.00	0	96.2	90	110			

Sample ID: **CCV3-201007**	Batch ID: **R112565**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_201007A**	Analysis Date: **10/8/2020 4:13:29 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.82	1.00	10.00	0	98.2	90	110			
Fluoride	3.99	0.400	4.000	0	99.7	90	110			
Sulfate	28.9	3.00	30.00	0	96.4	90	110			

Sample ID: **CCV4-201007**	Batch ID: **R112565**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_201007A**	Analysis Date: **10/8/2020 6:05:29 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.09	0.400	4.000	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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_201002B

The QC data in batch 98074 applies to the following samples: 2010012-01B, 2010012-02B, 2010012-03B, 2010012-04B, 2010012-05B, 2010012-06B, 2010012-07B, 2010012-08B, 2010012-09B

Sample ID: **MB-98074** Batch ID: **98074** TestNo: **M2540C** Units: **mg/L**
SampType: **MBLK** Run ID: **WC_201002B** Analysis Date: **10/2/2020 4:10:00 PM** Prep Date: **10/2/2020**

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-98074** Batch ID: **98074** TestNo: **M2540C** Units: **mg/L**
SampType: **LCS** Run ID: **WC_201002B** Analysis Date: **10/2/2020 4:10:00 PM** Prep Date: **10/2/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	714	10.0	745.6	0	95.8	90	113			

Sample ID: **2010006-05C-DUP** Batch ID: **98074** TestNo: **M2540C** Units: **mg/L**
SampType: **DUP** Run ID: **WC_201002B** Analysis Date: **10/2/2020 4:10:00 PM** Prep Date: **10/2/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	21800	1000	0	22600				3.60	5	

Sample ID: **2010006-06C-DUP** Batch ID: **98074** TestNo: **M2540C** Units: **mg/L**
SampType: **DUP** Run ID: **WC_201002B** Analysis Date: **10/2/2020 4:10:00 PM** Prep Date: **10/2/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	33600	1000	0	33500				0.298	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: 2010012
Project: A1 Area Landfill-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_201005B

The QC data in batch 98098 applies to the following samples: 2010012-10B, 2010012-11B, 2010012-12B, 2010012-13B

Sample ID: **MB-98098**	Batch ID: **98098**	TestNo: **M2540C**	Units: **mg/L**
SampType: **MBLK**	Run ID: **WC_201005B**	Analysis Date: **10/5/2020 4:45:00 PM**	Prep Date: **10/5/2020**

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-98098**	Batch ID: **98098**	TestNo: **M2540C**	Units: **mg/L**
SampType: **LCS**	Run ID: **WC_201005B**	Analysis Date: **10/5/2020 4:45:00 PM**	Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	740	10.0	745.6	0	99.2	90	113			

Sample ID: **2010016-01C-DUP**	Batch ID: **98098**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_201005B**	Analysis Date: **10/5/2020 4:45:00 PM**	Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	29100	1000	0	30000				3.05	5	

Sample ID: **2010016-02C-DUP**	Batch ID: **98098**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_201005B**	Analysis Date: **10/5/2020 4:45:00 PM**	Prep Date: **10/5/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	7200	200	0	7200				0.000	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: *27-Oct-20*

CLIENT: Golder
Work Order: 2010012
Project: A1 Area Landfill-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**
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
Selenium	0.00200	0.00500

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

October 26, 2020

DHL Analytical, Inc.

Sample Delivery Group:	L1270011
Samples Received:	10/06/2020
Project Number:	2010012
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 Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



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BMW-22 L1270011-01 Non-Potable Water

Collected by | Collected date/time 09/29/20 09:35 | Received date/time 10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

BMW-20 L1270011-02 Non-Potable Water

Collected by | Collected date/time 09/29/20 10:30 | Received date/time 10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

BMW-21 L1270011-03 Non-Potable Water

Collected by | Collected date/time 09/29/20 11:15 | Received date/time 10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

BMW-27 L1270011-04 Non-Potable Water

Collected by | Collected date/time 09/29/20 12:20 | Received date/time 10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

BMW-26 L1270011-05 Non-Potable Water

Collected by | Collected date/time 09/29/20 13:25 | Received date/time 10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

BMW-24 L1270011-06 Non-Potable Water

Collected by | Collected date/time 09/29/20 14:50 | Received date/time 10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

BMW-23 L1270011-07 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/29/20 15:40	10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

BMW-11AR L1270011-08 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/29/20 16:45	10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

BMW-19 L1270011-09 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/29/20 17:55	10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

BMW-18 L1270011-10 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/30/20 07:55	10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

BMW-28 L1270011-11 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/30/20 09:00	10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

BMW-33 L1270011-12 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/30/20 10:15	10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	RGT	Mt. Juliet, TN

	Collected by	Collected date/time	Received date/time
DUP-01 L1270011-13 Non-Potable Water		09/30/20 10:15	10/06/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1555292	1	10/12/20 15:20	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1560269	1	10/16/20 09:02	10/20/20 10:15	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1560269	1	10/16/20 09:02	10/16/20 22:58	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	3.13		0.558	0.932	10/20/2020 10:15	WG1555292
(T) Barium	*91.0*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*97.1*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	3.75		0.881	1.19	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.621		0.323	0.256	10/16/2020 22:58	WG1560269
(T) Barium-133	*95.0*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.15		0.548	0.968	10/20/2020 10:15	WG1555292
(T) Barium	*90.3*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*98.4*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.32		0.700	1.14	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.163	J	0.152	0.175	10/16/2020 22:58	WG1560269
(T) Barium-133	*99.9*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.48		0.472	0.82	10/20/2020 10:15	WG1555292
(T) Barium	*92.8*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*98.7*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	2.18		0.805	1.13	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.699		0.333	0.307	10/16/2020 22:58	WG1560269
(T) Barium-133	*90.3*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	-0.339	U	0.591	1.09	10/20/2020 10:15	WG1555292
(T) Barium	*109*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*99.4*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.147	U	0.794	1.39	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.147	J	0.203	0.297	10/16/2020 22:58	WG1560269
(T) Barium-133	*88.7*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.161	U	0.590	1.07	10/20/2020 10:15	WG1555292
(T) Barium	*106*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*101*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.395	U	0.848	1.42	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.234	J	0.258	0.348	10/16/2020 22:58	WG1560269
(T) Barium-133	*98.7*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.892	J	0.678	1.21	10/20/2020 10:15	WG1555292
(T) Barium	*99.8*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*98.1*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	2.14		1.11	1.39	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	1.24		0.435	0.18	10/16/2020 22:58	WG1560269
(T) Barium-133	*89.2*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.000	U	0.598	1.09	10/20/2020 10:15	WG1555292
(T) Barium	*96.3*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*102*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.687	J	0.922	1.31	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.687		0.324	0.216	10/16/2020 22:58	WG1560269
(T) Barium-133	*89.2*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.59		0.569	0.993	10/20/2020 10:15	WG1555292
(T) Barium	*90.8*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*107*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.80		0.754	1.19	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.209		0.185	0.197	10/16/2020 22:58	WG1560269
(T) Barium-133	*94.6*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.02	J	0.602	1.07	10/20/2020 10:15	WG1555292
(T) Barium	*106*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*102*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.02	J	0.707	1.38	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	-0.0717	U	0.105	0.312	10/16/2020 22:58	WG1560269
(T) Barium-133	*99.4*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	-0.338	U	0.500	0.927	10/20/2020 10:15	WG1555292
(T) Barium	*99.9*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*104*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.0836	U	0.664	1.2	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.0836	U	0.164	0.276	10/16/2020 22:58	WG1560269
(T) Barium-133	*94.6*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	2.53		0.568	0.964	10/20/2020 10:15	WG1555292
(T) Barium	*93.4*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*111*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	2.76		0.790	1.24	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.229	J	0.222	0.275	10/16/2020 22:58	WG1560269
(T) Barium-133	*104*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.419	U	0.556	0.999	10/20/2020 10:15	WG1555292
(T) Barium	*93.8*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*104*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.656	J	0.793	1.31	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.237	J	0.237	0.308	10/16/2020 22:58	WG1560269
(T) Barium-133	*102*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.82		0.501	0.86	10/20/2020 10:15	WG1555292
(T) Barium	*96.4*			*62.0-143*	*10/20/2020 10:15*	WG1555292
(T) Yttrium	*98.4*			*79.0-136*	*10/20/2020 10:15*	WG1555292

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	2.35		0.815	1.13	10/20/2020 10:15	WG1560269

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.537		0.314	0.273	10/16/2020 22:58	WG1560269
(T) Barium-133	*102*			*30.0-143*	*10/16/2020 22:58*	WG1560269

Method Blank (MB)

(MB) R3584340-1 10/19/20 10:10

Analyte	MB Result	MB Qualifier	MB MDA
	pCi/l		pCi/l
Radium-228	-0.149	U	0.546
(T) Barium	*96.9*		
(T) Yttrium	*99.0*		

L1266027-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1266027-01 10/19/20 10:10 • (DUP) R3584340-5 10/19/20 10:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	pCi/l		%			%	
Radium-228	0.0892	-0.0640	1	200	0.231	U	20	3
(T) Barium	*92.9*	*94.7*						
(T) Yttrium	*103*	*103*						

Laboratory Control Sample (LCS)

(LCS) R3584340-2 10/19/20 10:10

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-228	5.00	5.09	102	80.0-120	
(T) Barium			*95.7*		
(T) Yttrium			*101*		

L1268048-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1268048-01 10/19/20 10:10 • (MS) R3584340-3 10/19/20 10:10 • (MSD) R3584340-4 10/19/20 10:10

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	0.587	11.3	9.86	107	92.7	1	70.0-130			13.5		20
(T) Barium		*95.1*			*91.6*	*96.2*							
(T) Yttrium		*108*			*101*	*103*							

Method Blank (MB)

(MB) R3583496-1 10/16/20 22:58

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-226	0.00898	U	0.0593
(T) Barium-133	*95.9*		

L1270011-13 Original Sample (OS) • Duplicate (DUP)

(OS) L1270011-13 10/16/20 22:58 • (DUP) R3583496-5 10/16/20 22:58

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.537	0.301	1	56.4	0.596		20	3
(T) Barium-133	*102*	*95.4*						

Laboratory Control Sample (LCS)

(LCS) R3583496-2 10/16/20 22:58

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.02	5.36	107	80.0-120	
(T) Barium-133			*98.4*		

L1270011-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1270011-04 10/16/20 22:58 • (MS) R3583496-3 10/16/20 22:58 • (MSD) R3583496-4 10/16/20 22:58

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	0.147	20.4	19.9	101	98.3	1	75.0-125			2.48		20
(T) Barium-133		*88.7*			*96.0*	*99.6*							

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.

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

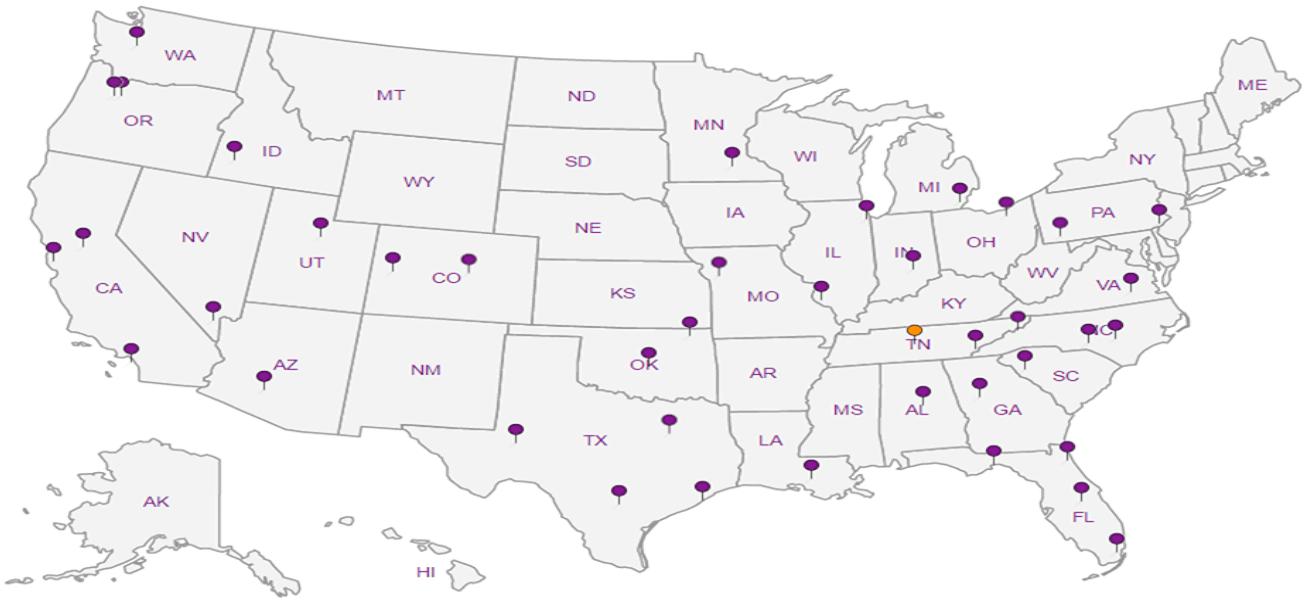
Third Party Federal Accreditations

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

Work Order: 2010012

CHAIN-OF-CUSTODY RECORD

WS 1270011

G035

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

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

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		

02-Oct-20

Sample ID	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests					
					Ra-228	Ra-226				
					E904.0	M7500 Ra B M				
BMW-22	Aqueous	01C	09/29/20 09:35 AM	1LHDPEHNO3	1					-01
BMW-22	Aqueous	01D	09/29/20 09:35 AM	1LHDPEHNO3		1				1
BMW-20	Aqueous	02C	09/29/20 10:30 AM	1LHDPEHNO3	1					02
BMW-20	Aqueous	02D	09/29/20 10:30 AM	1LHDPEHNO3		1				1
BMW-21	Aqueous	03C	09/29/20 11:15 AM	1LHDPEHNO3	1					03
BMW-21	Aqueous	03D	09/29/20 11:15 AM	1LHDPEHNO3		1				1
BMW-27	Aqueous	04C	09/29/20 12:20 PM	1LHDPEHNO3	1					04
BMW-27	Aqueous	04D	09/29/20 12:20 PM	1LHDPEHNO3		1				1
BMW-26	Aqueous	05C	09/29/20 01:25 PM	1LHDPEHNO3	1					05
BMW-26	Aqueous	05D	09/29/20 01:25 PM	1LHDPEHNO3		1				1
BMW-24	Aqueous	06C	09/29/20 02:50 PM	1LHDPEHNO3	1					06
BMW-24	Aqueous	06D	09/29/20 02:50 PM	1LHDPEHNO3		1				1
BMW-23	Aqueous	07C	09/29/20 03:40 PM	1LHDPEHNO3	1					07
BMW-23	Aqueous	07D	09/29/20 03:40 PM	1LHDPEHNO3		1				1
BMW-11AR	Aqueous	08C	09/29/20 04:45 PM	1LHDPEHNO3	1					08
BMW-11AR	Aqueous	08D	09/29/20 04:45 PM	1LHDPEHNO3		1				1
BMW-19	Aqueous	09C	09/29/20 05:55 PM	1LHDPEHNO3	1					09

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:	Eu	10/2/20 1700	Received by:	Carol Kemp CK	10/6/20 10:30
Relinquished by:			Received by:		

12 70041

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664
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CHAIN-OF-CUSTODY RECORD

Work Order: 2010012

Subcontractor:

Pace Analytical
12065 Lebanon Rd
Mt. Juliet, TN 37122

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

02-Oct-20

Sample ID	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests					
					Ra-228 E904.0	Ra-226 M7500 Ra B M				
BMW-19	Aqueous	09D	09/29/20 05:55 PM	1LHDPEHNO3		1				09
BMW-18	Aqueous	10C	09/30/20 07:55 AM	1LHDPEHNO3	1					10
BMW-18	Aqueous	10D	09/30/20 07:55 AM	1LHDPEHNO3		1				1
BMW-28	Aqueous	11C	09/30/20 09:00 AM	1LHDPEHNO3	1					11
BMW-28	Aqueous	11D	09/30/20 09:00 AM	1LHDPEHNO3		1				1
BMW-33	Aqueous	12C	09/30/20 10:15 AM	1LHDPEHNO3	1					12
BMW-33	Aqueous	12D	09/30/20 10:15 AM	1LHDPEHNO3		1				1
DUP-01	Aqueous	13C	09/30/20 10:15 AM	1LHDPEHNO3	1					13
DUP-01	Aqueous	13D	09/30/20 10:15 AM	1LHDPEHNO3		1				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

		Date/Time			Date/Time
Relinquished by:	E—	10/2/20 1700	**Received by:**	Carol Kemp	10/6/20 10:30
Relinquished by:			**Received by:**		

APPENDIX B

Groundwater Modeling Notes

A1 AREA LANDFILL GROUNDWATER MODEL NOTES

By: William Vienne, Golder

Date: July 2020

Objective: Create a groundwater model using Visual Modflow to setup steady-state hydrogeological conditions for use in PHREEQC geochemical model.

Units

length:	feet	pumping rate:	gal/min
time:	day	recharge:	in/year
concentration:	mg/L	mass:	kg
conductivity:	cm/s		

Default Parameters

Kx:	3.05E-4 cm/s	(From slug test data in PBW (2017)	Sy:	0.22	(assumed based on typical sand value)
Ky:	3.05E-4 cm/s		eff. Porosity:	0.25	(assumed based on typical sand value)
Kz:	3.05E-5 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		

Base Map

Base map: May 2019 groundwater potentiometric surface map

Two-point georefence:

Georeference Points	Georeferenced Coordinates	Coordinate System
BMW-29	E3194121/N6785743	Texas State Plane, North Central Zone, NAD 83
BMW-33	E3202513/N6790816	

Model Setup

Grid

Model origin:	0, 0	
Model max:	14000, 14000	
Columns	Rows	
70	70	(200-ft grid cells)

Layers

A1 Area Landfill is completed in and surrounded by previously mined spoil, modeled as a 1-layer model that assumes the landfill and surrounding mine spoil have similar hydraulic properties.

Layer 1: Landfill and adjacent mine spoil

- Landfill extent based on aerial photo showing landfill boundary. Landfill depth of 350 ft amsl approximated from base elevations shown on Expansion Area construction drawings (used in geochem model).
- Base of layer set to 285 feet amsl (average base of spoil in monitoring well borings).
- Generated ground surface elevation grid using well ground surface elevations and planned max landfill cap elevation of 505 feet in center of landfill. Imported excel file with model coordinates and elevations. Used Natural Neighbor function for interpolation.
- K of landfill and mine spoil surrounding landfill set to default values based on slug tests: Kxy =3.05E-4 cm/s; Kz = 3.05E-5 cm/s

Boundary Conditions

- Constant head boundaries created gw gradient similar to that shown on May 2019 pot map, with groundwater generally flowing from the north toward the west, south, and east sides of the landfill. Used linear gradient boundaries.

Calibration

Model vs.Observed Head in CCR wells (Septemeber 2019):

Residual Mean: -1.117 ft
Standard Error of the Estimate: 3.454 ft
Correlation Coefficient: 0.812

Deliverables for PHREEQC Model

1. VMOD head files (x, y, z, and head)
2. Surface elevation grid
3. Shapefile showing landfill outline

References

Pastor, Behling & Wheeler, LLC (PBW), 2017. Coal Combustion Residual Rule Groundwater Monitoring System Certification, Martin Lake Steam Electric Station – A1 Area.

APPENDIX C

Geochemical Modeling Saturation Indices

APPENDIX C
GEOCHEMICAL MODELING
RELEVANT MINERAL PHASES - Saturation Indices
MARTIN LAKE A1 AREA LANDFILL

MINERAL PHASES - Saturation Indices		BMW-11AR	BMW-18	BMW-19	BMW-20	BMW-21	BMW-22	BMW-23	BMW-24	BMW-25	BMW-26	BMW-27	BMW-28	BMW-29	BMW-30	BMW-31	BMW-32	BMW-33	S-1
Ferrihydrite	$Fe(OH)_3$	**2.78**	**2.59**	**3.24**	**4.59**	**3.34**	**3.85**	**3.60**	**4.31**	**2.49**	**2.29**	**2.19**	**2.55**	**2.30**	**2.89**	**2.63**	**4.68**	**2.67**	**3.82**
Siderite	$FeCO_3$	-1.07	-1.87	-2.27	**0.81**	-1.74	**-0.20**	**-0.03**	**0.13**	-1.89	-1.82	-2.04	-1.95	-1.74	-1.94	-2.03	**0.33**	-1.81	-0.62
Melanterite	FeSO4:7H2O	-6.23	-7.29	-6.72	-3.73	-7.12	-4.89	-4.92	-4.67	-6.84	-6.97	-7.00	-6.76	-6.85	-6.88	-6.94	-4.79	-7.17	-4.48
Gypsum	$CaSO_4:2H_2O$	-1.13	-2.45	**-0.15**	-0.73	-1.00	-0.66	-1.08	-1.39	-0.87	-0.68	-0.78	**-0.41**	-0.75	-0.97	-1.10	-1.15	-1.28	**-0.14**
Calcite	$CaCO_3$	**-0.10**	-1.16	**0.17**	**-0.31**	**0.25**	**-0.10**	**-0.33**	-0.72	**-0.04**	**0.35**	**0.05**	**0.26**	**0.23**	**-0.15**	**-0.32**	**-0.16**	**-0.06**	**-0.40**
Magnesite	$MgCO_3$	-1.51	-2.55	-0.84	-1.17	-0.57	-0.96	-1.12	-1.51	-1.07	-0.66	-0.96	-0.65	-0.80	-1.24	-1.40	-1.02	-1.02	-1.78
Barite	$BaSO_4$	**0.50**	**-0.01**	**0.30**	**0.75**	**0.35**	**0.82**	**0.45**	**1.09**		**0.36**	**0.26**	**0.65**		**0.76**			**1.07**	**0.45**
Witherite	$BaCO_3$	-3.75	-4.01	-4.67	-4.12	-3.69	-3.92	-4.09	-3.53		-3.90	-4.21	-3.97		-3.71			-2.99	-5.10
Fluorite	CaF_2	-3.22		-3.02	-3.20	-3.24	-3.19	-3.34	-3.15	-3.25	-3.07	-3.10	-3.19	-3.19	-3.20	-3.22	-1.75		-1.56
CoCO3	$CoCO_3$	-3.34	-3.45	-3.80	-2.32	-3.36	-3.74	-3.69	-3.27		-3.43	-3.65	-3.52				-3.18	-2.82	-3.33
Carbon Dioxide	$pCO_{2(g)}$ (b)	-1.17	-1.38	-1.09	-1.43	-0.99	-1.03	-0.91	-1.39	-0.99	-0.84	-0.68	-1.01	-1.07	-1.40	-1.41	-1.32	-0.98	-1.39

Notes:

Saturation indices >-0.5 identified by red bold type and grey shading

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



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APPENDIX C

Tier IV Monitored Natural Attenuation Performance Monitoring Plan

REPORT

Tier IV MNA Performance Monitoring Plan

Martin Lake Steam Electric Station - A1 Area Landfill
Panola County, Texas

Submitted to:

Luminant Generation Company LLC

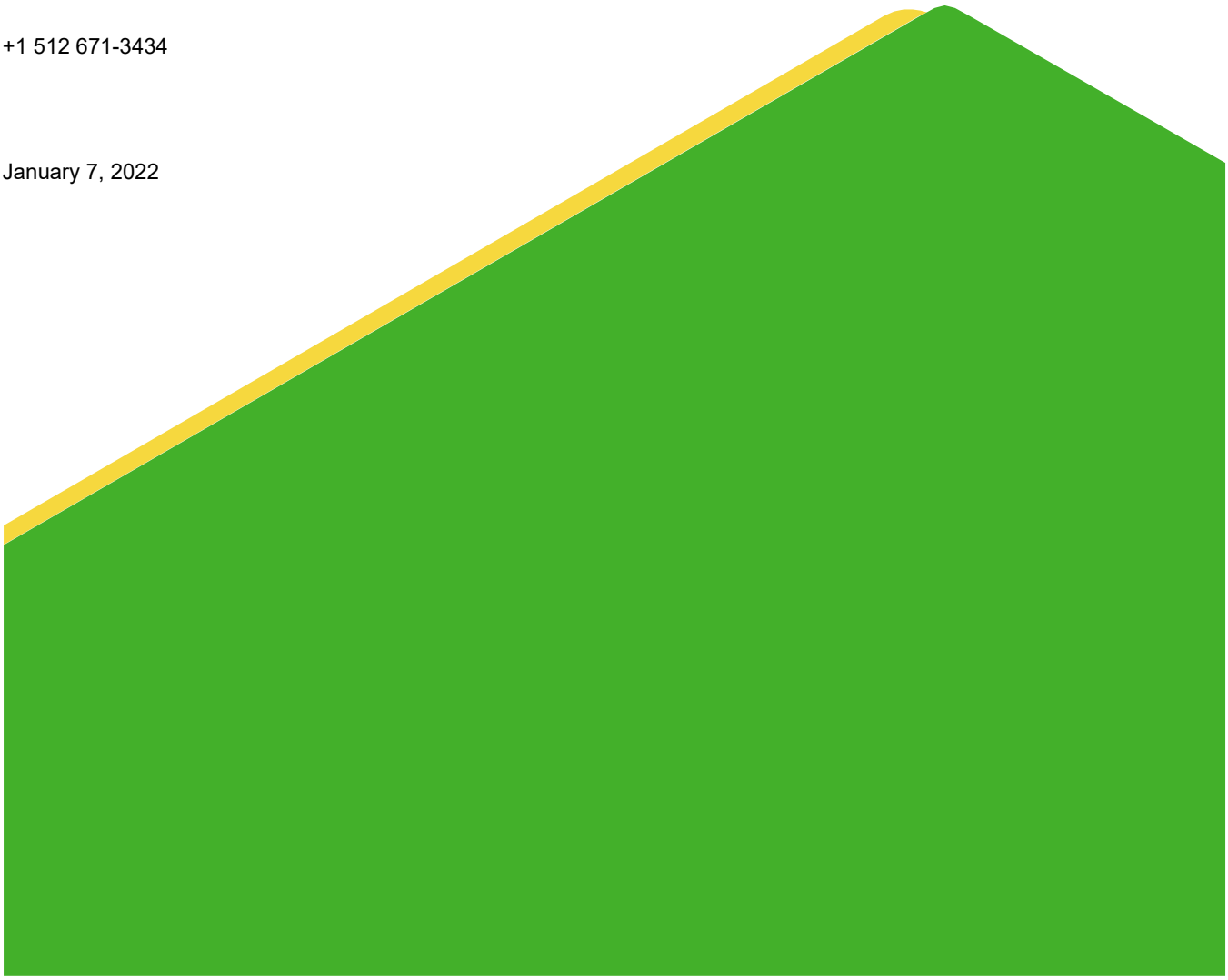
Submitted by:

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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4.1.1 General Groundwater Sampling Procedures 2

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FIGURES

Figure 1 Detailed Site Plan

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 A1 Area Landfill located at the Beckville Lignite Mine in Panola County, Texas (hereafter, the "Site"). Luminant manages coal combustion residuals (CCR) generated from the Martin Lake Steam Electric Station (MLSES) in the A1 Area Landfill per the applicable requirements of 40 Code of Federal Regulations (CFR) Part 257 Subpart D as amended (CCR Final Rule).

The initial assessment monitoring event was performed at the Site in 2018 in accordance with §257.95(a) and §257.95(d). The Appendix IV data collected during the assessment monitoring period through September 2018 identified statistically significant levels (SSLs) above groundwater protective standards (GWPSs) for arsenic, barium, cobalt, and lithium. Based on the statistical analysis of Appendix IV groundwater data collected through 2021, which was performed in compliance with the United States Environmental Protection Agency (USEPA) Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities-Unified Guidance (USEPA 2009), arsenic, barium, cobalt, and lithium are the Appendix IV constituents that have been detected in groundwater at the Site at SSLs above GWPSs. In response to the SSLs identified in 2018, an Assessment of Corrective Measures (ACM) Report was completed for the A1 Area Landfill in September 2019 as required by 40 CFR § 257.96 (Golder 2019a). Although cobalt is the only Appendix IV constituent currently identified at SSLs above GWPSs (in wells BMW-20 and BMW-27), the ACM evaluated arsenic, barium, cobalt, and lithium based on the SSLs initially identified in 2018.

As documented in the Remedy Selection Report for the A1 Area Landfill (Golder 2021a), MNA in conjunction with source control measures was selected as the remedy to address arsenic, barium, 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 arsenic, barium, cobalt, and lithium:

- Physical and chemical attenuation of arsenic, barium, cobalt, and lithium is occurring at the Site. Concentrations of these constituents in groundwater are stable or decreasing 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 Site.

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 A1 Area Landfill is located at the Beckville Lignite Mine, approximately 2.5 miles southeast of the MLSES in Panola County, Texas (**Figure 1**). The A1 Area Landfill is an above grade landfill that is considered an existing CCR Landfill under the CCR Rule. CCR is transported to the landfill in rail cars, off loaded and placed within the

active areas at the landfill. 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 1970). 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 A1 Area Landfill is located within reclaimed areas of the former Beckville Lignite Mine (a subsection of the Martin Lake Lignite Mine). The inferred direction of groundwater flow is to the east-southeast and west from the A1 Area Landfill, with a lesser flow component to the south (PBW, 2017).

The CCR groundwater monitoring well network at the A1 Area Landfill was established in 2015 and consists of monitoring wells BMW-11A-R, BMW-18, BMW-19, BMW-20, BMW-21, BMW-22, BMW-23, BMW-24, BMW-26, BMW-27, BMW-28, and BMW-33. The uppermost groundwater-bearing unit (GWBU) occurs under unconfined conditions within the previously mined spoil zone above native Wilcox material.

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 A1 Area Landfill 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 arsenic, barium, cobalt, and lithium (Appendix IV constituents) 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 include all of the CCR monitoring 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 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 additionally 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 uses 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 are also collected periodically to assess potential occlusion of the well screens.

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 GWBU. 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:

- Arsenic, barium, 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 arsenic, barium, cobalt, and lithium concentrations are present in groundwater at SSLs above the GWPSs;
- Evaluating long-term trends in arsenic, barium, 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 collecting periodic general geochemistry sample data 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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Golder. 2019b. Tier I MNA Evaluation, Martin Lake Steam Electric Station – Martin Lake Steam Electric Station – A1 Area Landfill, Panola County, Texas. December.

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Pastor, Behling & Wheeler, LLC (PBW), 2017. Coal Combustion Residual Rule Groundwater Monitoring System Certification, Martin Lake Steam Electric Station, A1 Area Landfill, Panola County, Texas. October.

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

Signature Page

Golder Associates Inc.



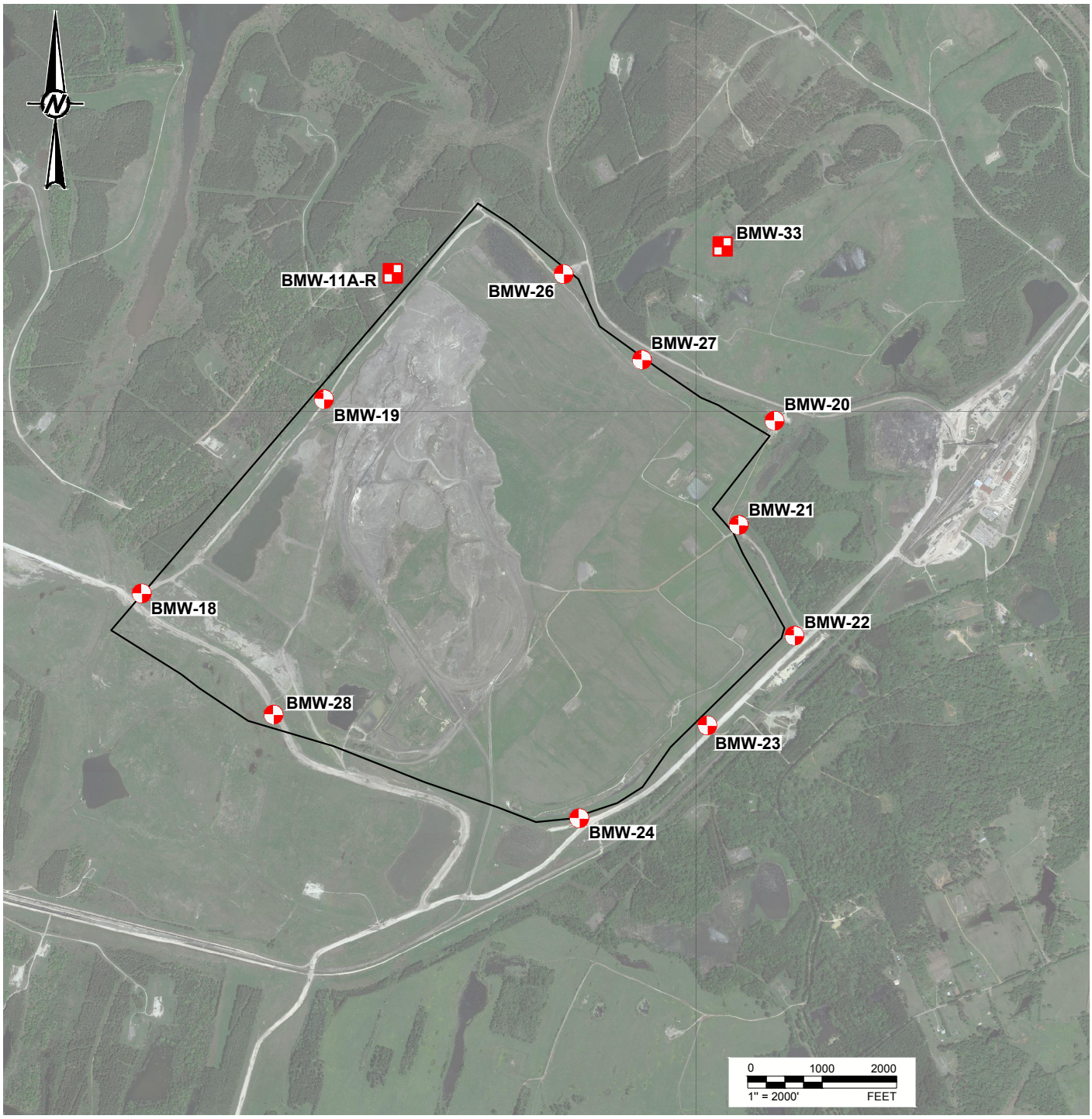
Roberta Russell
Senior Geologist



William Vienne
Senior Consulting Hydrogeologist

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https://golderassociates.sharepoint.com/sites/127388/project files/5 technical work/3000-a1 area landfill/tier iv and remedy selection/tier iv mon plan/a1 lf tier iv mon plan.docx



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 - A1 AREA LANDFILL

CONSULTANT
GOLDER

YYYY-MM-DD	2021-01-11
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	CONTROL	REV.	FIGURE
19134019		0	1

Last Edited By: adiamond Date: 2021-01-11 Time:10:21:51 AM | Printed By: adiamond Date: 2021-01-11 Time:10:23:01 AM
Path: \\texarkanadata\Projects - Round Rock_2019\19122682 - Luminant\D - MLSES\2020 CCR GWMR\ | File Name: FIG 1 - Detailed Site Plan (A1 Area Landfill).dwg

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



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