FINAL

## 2018 Annual Groundwater Monitoring Report for the Limited Purpose Landfill at the TransAlta Centralia Mine, near Centralia, Washington

Prepared for TransAlta Centralia Mining LLC

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999 W. Riverside Ave Suite 500 Spokane, WA 99201 (509) 747-2000 This Report has been certified by a Professional Engineer and a Hydrogeologist licensed in the State of Washington and employed by CH2M HILL Engineers, Inc., a wholly owned subsidiary of Jacobs Engineering Group Inc. as of December 15, 2017.



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## Acronyms and Abbreviations

| °C               | degrees Celsius   |
|------------------|---|
| CCR              | coal combustion residuals   |
| CCR SAP          | Groundwater Monitoring Sampling and Analysis Plan for the Limited Purpose Landfill<br>at the TransAlta Centralia Mine |
| CFR              | Code of Federal Regulations   |
| DQR              | Double Quantification Rule  |
| EPA              | U.S. Environmental Protection Agency  |
| HNO <sub>3</sub> | nitric acid   |
| LPLF             | Limited Purpose Landfill  |
| mg/L             | milligram per liter   |
| SSI              | statistically significant increase  |
| SWFPR            | sitewide false positive rate  |
| ТСМ              | TransAlta Centralia Mine  |
| UPL              | Upper Prediction Limit  |
| WAC              | Washington Administrative Code  |

This section summarizes the 2018 annual report's purpose and objectives, the document organization, and provides the site description and the status of the monitoring program.

## 1.1 Purpose and Objectives

This document is the 2018 annual report for the Limited Purpose Landfill at the TransAlta Centralia Mine (TCM), as required per *CCR Groundwater Monitoring and Corrective Action* of 40 Code of Federal Regulations (CFR), 257.90(e), *Annual Groundwater Monitoring and Corrective Action Report*. Per the CCR Rule, the minimum requirements for each annual report submittal must include the following (as itemized per 40 CFR 257.90(e) [items 1 through 5]):

- 1. A map showing the Coal Combustion Residuals (CCR) unit (landfill) and the designated CCR groundwater monitoring network, including upgradient and downgradient wells with well identification numbers
- 2. The identification of monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description, and the reasons those actions were taken
- 3. A summary of the groundwater samples that were collected for analysis for each upgradient (or background) and downgradient well, the dates the samples were collected, and whether the sample was required by the detection or assessment monitoring program
- 4. A narrative discussion of transition between monitoring programs (the date and circumstances of transitioning from detection phase to assessment monitoring)
- 5. Other information required per 40 CFR 257.90 through 257.94, interpreted to include the following:
  - A map showing groundwater elevations, inferred groundwater elevation contours, and inferred groundwater flow direction from the sampling events conducted during the year
  - A groundwater elevation hydrograph, including data over the period of record
  - Groundwater flow rates for the semiannual events conducted during the preceding year
  - Results from data quality review and data validation
  - A summary of the statistical method and the respective background (compliance) limits for Detection Monitoring (Appendix III) constituents
  - A summary of any Appendix III constituents that are identified as a statistically significant increase (SSI) greater than background levels

In addition to these technical information, the annual report must also include narrative of the following items:

- Documentation of the status of the monitoring program (that is, detection or assessment phase)
- Key actions completed for the preceding calendar year
- A description of problems encountered, and actions taken to resolve the problems (if needed)
- Key activities anticipated for the upcoming year

The annual reports are due by January 31, and summarize monitoring results from the preceding year. The CCR Rule requires specific reports and notifications throughout the monitoring process, with up to three forms of submittals:

- The site's operating record (40 CFR 257.105)
- Notifications to the State Director (40 CFR 257.106)
- The publicly accessible internet site (40 CFR 257.107)

#### 1.2 Document Organization

The document is organized into the following sections:

- Section 1. Introduction. Presents the document purpose and objectives, site description, and status of monitoring program.
- Section 2. Monitoring Program Description. Summarizes the groundwater monitoring system design (well network) and the sampling program for the Limited Purpose Landfill.
- Section 3. Groundwater Monitoring Results. Summarizes the groundwater monitoring information related to background data collection and the initial compliance event, and provides a map showing groundwater elevations and inferred flow direction, estimates of groundwater seepage velocity, and a summary of groundwater quality results for the initial compliance event.
- Section 4. Statistical Evaluation. Summarizes the statistical method and the compliance limits, and compares the initial compliance results to the compliance limits to determine whether there is an SSI greater than background conditions for the Appendix III constituents.
- Section 5. Alternative Source Demonstration. Summarizes statistical significant exceedances the detection monitoring results, retesting, confirmation, and documentation of an alternative source demonstration for the confirmed values.
- Section 6. Summary. Summarizes the key points of the initial annual report per the CCR regulatory requirements.
- Section 7. References. Lists the documents referenced to develop this report.

#### 1.3 Site Description

TCM manages the Limited Purpose Landfill, which is approximately 7 miles east of Centralia, Washington (Figure 1). The Limited Purpose Landfill is north of Pit 7 in the Centralia Mine. The site is in the southern half of Section 33, Township 15N, Range 1W; Latitude 46°44′23″ North, Longitude 122°49′55″. The site address is 913 Big Hanaford Road, and the Property Tax Parcel (Account) Number is 023387001000. The permitted area encompassing the Limited Purpose Landfill is 57 acres, and the actual footprint of the waste disposal area is 18 acres (Figure 2). The Limited Purpose Landfill consists of the waste disposal area, and the surface impoundments immediately south of the waste disposal area to manage leachate generated at the disposal cell.

TransAlta Centralia Generation LLC operates a coal-burning power plant that is located adjacent to TCM and generates residual ash waste; the residual ash waste is disposed of into the Limited Purpose Landfill. The construction of Stage 1 began during the summer of 2009, and the Lewis County Environmental Health Department authorized TCM to begin waste disposal operations effective October 31, 2009. On December 21, 2009, the Lewis County Environmental Health Department amended the facility permit to approve the disposal of residual ash waste in Stage 1 Area A3a, in addition to Areas A1 and A2, which had been approved for disposal in the original permit. The Stage 2 Area of the Limited Purpose Landfill

was constructed in three phases from 2011 through 2014 and was subsequently approved for the receipt of ash waste material.

### 1.4 Status of the Groundwater Monitoring Program

The groundwater monitoring program is currently in the detection phase, as described under 40 CFR 257.94, *Detection Monitoring Program*.

The following items summarize the key actions completed for the Limited Purpose Landfill to implement the CCR Rule:

- In July of 2016, a focused field investigation was completed to implement the detection groundwater monitoring network to satisfy CCR regulations as described in the *Groundwater Monitoring Well Construction Data Report for the Limited Purpose Landfill at the TransAlta Centralia Mining LLC Site* (CH2M, 2016a). The well completion data report describes the activities for drilling two borings and installing two new groundwater monitoring wells in the uppermost aquifer to augment the existing monitoring network.
- Beginning in November 2016, background groundwater monitoring and related data evaluation was initiated in support of establishing the CCR detection groundwater monitoring program, as described in the *Groundwater Monitoring Sampling and Analysis Plan for the Limited Purpose Landfill at the TransAlta Centralia Mine LLC* (hereafter the CCR SAP) (CH2M, 2016b).
- In October 2017, the groundwater monitoring system design was documented and posted to the publicly available website as described in the *Coal Combustion Residual Groundwater Monitoring System Certification for the Limited Purpose Landfill at the Centralia Mine Site near Centralia, Washington* (CH2M, 2017a).
- In October 2017, the selected statistical method was documented and posted to the publicly available website, as described in the *Coal Combustion Residual Statistical Method Certification for the Limited Purpose Landfill at the Centralia Mine near Centralia Washington* (CH2M, 2017b).
- In January 2018, the 2017 Annual Groundwater Monitoring Report for the Limited Purpose Landfill at the TransAlta Centralia Mine was documented and posted to the publicly available website.
- In October 2018, a spring 2018 Alternative Source Demonstration for the Limited Purpose Landfill at the TransAlta Centralia Mine was documented and posted to the publicly available website.

# Monitoring Program Description

This section summarizes the CCR groundwater monitoring program for the Limited Purpose Landfill.

### 2.1 Monitoring Program

Groundwater is monitored in accordance with the CCR SAP (CH2M, 2016). Details regarding the site hydrogeology, the stratigraphic sequence, the uppermost aquifer, and the lower aquitard/confining unit are presented in the groundwater monitoring system design document (CH2M, 2017a) posted to the publicly available website and are not reiterated herein. Details regarding the monitoring network, sampling, and field/laboratory quality control are described in the following sections.

## 2.2 Monitoring Network

Effective April 17, 2015, the CCR regulations (specifically, 40 CFR 257.91, *Groundwater Monitoring Systems*) require a facility to install a detection groundwater monitoring system at appropriate locations and depths to yield groundwater samples from the uppermost aquifer and monitoring of all potential contamination pathways. At least one upgradient well must accurately represent the quality of background groundwater unaffected by potential leakage from the CCR unit. The regulations also state that at least three downgradient wells must accurately represent the quality of groundwater passing the waste boundary for the detection of potential groundwater contamination in the uppermost aquifer.

Table 1 summarizes the groundwater monitoring well network and construction details for the Limited Purpose Landfill. Figure 2 shows the designated CCR groundwater monitoring network, which consists of five wells screened in the uppermost aquifer and located around the perimeter of the ash disposal area. Monitoring well LPLF-1 and LPLF-5 are effectively upgradient of the landfill and used to characterize background conditions unaffected by the landfill, and wells LPLF-2R, LPLF-7R, and LPLF-8 are downgradient and designated as compliance wells. As noted in Section 1.4, documentation of the CCR *Groundwater Monitoring Systems* design was submitted to the publicly available website in October 2017, as described in the *Coal Combustion Residual Groundwater Monitoring System Certification for the Limited Purpose Landfill at the Centralia Mine near Centralia, Washington* (CH2M, 2017a).

#### 2.3 Groundwater Level Measurement

Static groundwater level measurements are collected during each monitoring event to calculate groundwater elevations, estimate groundwater flow direction, and calculate the groundwater seepage velocity. Groundwater elevations are calculated by subtracting the field measured static depth to water from the surveyed top-of-casing elevations relative to the local vertical datum (NAD 27, Washington State Plane, North 3601, Feet Intl). Field-measured groundwater levels are recorded on field forms (provided in Appendix A) and the groundwater level data are presented in Section 3.

## 2.4 Groundwater Sampling

Each well is equipped with dedicated tubing to facilitate low-flow sampling methods, except for LPLF-1, which is bailed to collect the sample. A peristaltic pump is used to support sampling methods required for low-flow (minimal drawdown) groundwater sampling procedures as described under *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers* (EPA, 2002). In accordance with the low-flow method, purging continues until field parameters have stabilized to acceptable tolerances as outlined in the CCR SAP (CH2M, 2016b). Field parameters are measured using factory-calibrated multiparameter probe. Appendix A includes copies of field sampling forms for sampling events conducted in 2018.

Groundwater samples were collected in laboratory-provided sample containers. Below are the test methods, reporting limits, and preservatives to collect groundwater samples for the Appendix III constituents for detection monitoring.

| Constituent            | Analytical Test Method | Reporting Limit (mg/L) | Preservative     |
|------------------------|------------------------|------------------------|------------------|
| Boron                  | EPA 6010C              | 0.01                   | HNO <sub>3</sub> |
| Calcium                | EPA 6010C              | 0.05                   | HNO <sub>3</sub> |
| Chloride               | EPA 9056A              | 2.5                    | Chill to 4°C     |
| Fluoride               | EPA 9056A              | 0.05                   | Chill to 4°C     |
| рН                     | SM 4500H B             | 0.1                    | Chill to 4°C     |
| Sulfate                | EPA 9056A              | 10                     | Chill to 4°C     |
| Total Dissolved Solids | SM 2540C               | 1                      | Chill to 4°C     |

°C = degrees Celsius

 $HNO_3 = nitric acid$ 

mg/L = milligram per liter

Laboratory analyses were performed by an accredited and certified testing laboratory (ALS, from Kelso, Washington).

## 2.5 Field and Laboratory Quality Control

As described in the CCR SAP (CH2M, 2016b), field and laboratory quality control are guided by the field quality control procedures that included sample labeling, chain-of-custody documentation, and sealing of sample containers following sample collection. Field duplicate and matrix spike (with duplicates) samples are collected during each sampling event. Temperature and method blanks are included with each shipment.

Laboratory quality control procedures included analysis of method blanks, surrogates, duplicates, and matrix spike/matrix spike duplicates. Results from the laboratory quality control are included in the analytical data packages and are included in Appendix B.

## Groundwater Monitoring Results

This section summarizes the groundwater monitoring results related to the dates of sampling for the monitoring events, groundwater elevations, groundwater flow direction, the estimates of groundwater seepage velocity, and the groundwater quality results from the monitoring events.

### 3.1 Compliance Monitoring Events

The CCR Rule requires at least eight background groundwater monitoring events before the October 17, 2017, deadline to establish background conditions. Monitoring events after the eighth background event are considered initial detection-phase compliance monitoring to determine whether there is an SSI greater than background conditions. Below is a summary of the compliance and resampling events and the respective constituent suites for the sampling events.

| Monitoring Event<br>Type/Purpose | Date Completed   | Appendix III, Detection<br>Monitoring Constituents | Resampled Wells  |
|----------------------------------|------------------|--|------------------|
| Detection/Compliance             | May 30, 2018     | Yes  | NA               |
| Resampling/Confirmation          | August 9, 2018   | 4 Constituents                                     | LPLF-2R, LPLF-8  |
| Detection/Compliance             | October 24, 2018 | Yes  | NA               |
| Resampling/Confirmation          | January 7, 2019  | 5 Constituents                                     | LPLF-2R, LPLF-7R |

#### 3.2 Groundwater Levels and Hydrographs

Table 2 summarizes the groundwater measurements from the 2018 groundwater monitoring program. Figure 3 shows the groundwater elevation hydrograph from the CCR network wells from the initial monitoring events conducted from November 2016 through October 2018. In general, groundwater elevations have decreased in 2018. Continued monitoring will be used to assess the need to evaluate seasonal patterns, characteristics, or apparent trends in the site hydrograph.

## 3.3 Groundwater Flow Direction

Figures 4 and 5 show the elevation contours and inferred flow direction for the groundwater conditions at the site for May and October 2018, respectively. The groundwater in the uppermost aquifer beneath the Limited Purpose Landfill generally flows to the southwest. Note that upgradient well LPLF-5 was dry at the time of sampling event, which is consistent with lower groundwater elevations and as displayed in conditions monitored quarterly since 2007 under the Washington Administrative Code (WAC) 173-350-500 monitoring program administered by the Washington State Department of Ecology. A flow direction to the southwest is consistent with historical groundwater monitoring results.

## 3.4 Groundwater Flow Velocity Estimates

The estimated groundwater seepage velocity is 13 to 16 feet per year, which is based on the following equation and hydraulic assumptions and groundwater elevations in the uppermost aquifer:

where:

 $v = \frac{K_a i}{k_a i}$ 

| ν       | = | groundwater velocity (seepage velocity)   |
|---------|---|---|
| $K_{a}$ | = | average horizontal hydraulic conductivity |
| i       | = | horizontal hydraulic gradient             |
| $n_e$   | = | effective porosity                        |

- An average hydraulic conductivity estimate of 0.11 feet per day (equivalent to 3.88 x 10<sup>-5</sup> centimeters per second), which is based on slug test analyses and as summarized in the *Coal Combustion Residual Groundwater Monitoring System Certification for the Limited Purpose Landfill at the Centralia Mine Site near Centralia, Washington* (CH2M, 2017a).
- Hydraulic gradient ranged from 0.05 to 0.06 feet per foot, as measured from Figures 4 and 5. These values are considered a typical value based on previous monitoring performed under the pre-existing WAC program since 2007
- Effective porosity of 0.15 (assumed value generally representative of mine spoils)

#### 3.5 Groundwater Quality Results

Table 3 presents the field readings and the groundwater quality results for the Appendix III constituents from the 2018 groundwater monitoring and resampling events. Groundwater data from the monitoring events are compared to the background conditions per the selected statistical method to determine whether the initial compliance values exceed background concentrations, as presented in Section 4. Resampling was conducted to confirm parameters that represented statistically significant exceedances for those wells and parameters identified.

#### 3.6 Data Quality Assessment

The groundwater quality data were reviewed to assess the representativeness and usability of data before performing statistical evaluations as presented in Section 4. The method for performing the data quality review is documented in the CCR SAP (CH2M, 2016b) and follows procedures in the U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Superfund Methods Data Review* (EPA, 2016). As shown in Table 3, the values for pH were flagged as "J" values (estimates) as they were analyzed outside their hold time. Values for calcium were flagged in LPLF-2R in May, and LPLF-7R in October since the matrix spike (MS) recovery was low and below the acceptance criteria.

Chain of custody documentation, required quality control samples and frequency, laboratory control sample and sample duplicate, and field duplicates met the required limits and were consistent with the CCR SAP for the site. Based on this review, the field and laboratory methods followed the procedures specified in the CCR SAP, the completeness target/goal of 100 percent was achieved, none of the data were rejected, and data were found to satisfy the data quality objectives to be included for statistical evaluation as presented in Section 4.

This section summarizes the CCR regulatory requirements for statistical evaluation under the detection phase, as well as the selected statistical method, and compares the 2018 monitoring data to determine if monitoring values exceed compliance limits.

#### 4.1 Statistical Evaluation Regulatory Requirements

The CCR Rule specifically lists four methods acceptable for statistical analysis (40 CFR 257.93[f]):

- 1. Parametric or nonparametric analysis of variance
- 2. Tolerance intervals
- 3. Prediction intervals (limits)
- 4. Control charts

Another statistical test method also may be considered if it meets the performance standards listed in 40 CFR 297.93(g). Per the CCR Rule, the selected statistical method was posted to the publicly available website by the October 17, 2017, deadline.

### 4.2 Statistical Evaluation Methods and Compliance Limits

Based on the site-specific groundwater conditions and results from an exploratory evaluation on the background data, the selected statistical method for evaluating groundwater detection monitoring data is a prediction interval (limit) method, which is a statistical method option, per 40 CFR 257.93(f)(3). The prediction interval method will be used separately for each well-constituent pair and was selected because the Appendix III constituents exhibited significant spatial variability, making an upgradient versus downgradient, also known as interwell, comparison infeasible. The method for six of the seven Appendix III constituents (including boron, calcium, chloride, pH, sulfate, and TDS) is an intra-well Prediction Limit; the seventh constituent, fluoride, is handled separately via the Double Quantification Rule (DQR). Per EPA *Unified Guidance* (2009), the DQR is applicable to constituents that exhibit 100 percent no-detect characteristics, and fluoride is 100 percent nondetect during the background period. The DQR method, which is applicable to fluoride only, assumes that a SSI is confirmed if both the original and retest values are confirmed to be detected values. Supplemental details and rationale for method selection are presented in *Coal Combustion Residual Statistical Method for the Limited Purpose Landfill at the Centralia Mine near Centralia, Washington* (CH2M, 2017b), which has been posted to the CCR public website prior to the October 17, 2017, deadline.

EPA's Unified Guidance (2009) recommends that prediction limits be combined with retesting for maintaining a low sitewide false positive rate (SWFPR) while providing high statistical power. The exploratory analysis confirmed a "1-of-2" retesting strategy is acceptable and will be used to verify an apparent SSI (that is, an initial SSI for Appendix III constituents). Retesting is an integral part of the statistical methodology for controlling the SWFPR when multiple monitoring locations and parameters are being evaluated. Assuming the "1-of-2" retesting approach, an apparent SSI cannot be confirmed or denied until the results of the resampling event have been obtained.

Following the prediction interval method, the compliance limits were calculated on the CCR Appendix III constituents for the three downgradient compliance wells (LPLF-2R, LPLF-8, and LPLF-7R). The calculation of intra-well prediction limits is used for six of the seven CCR constituents, including boron, calcium, chloride, pH, sulfate, and TDS; fluoride is evaluated separately via the DQR as a result of the 100 percent nondetects during background period. Assuming that sample background data are normally

distributed, or assuming that they can be transformed to fit a normal distribution, then the parametric upper prediction limit (UPL) is based on equation (1) as follows:

$$UPL = \overline{x} + Ks \tag{1}$$

where:

 $\overline{x}$  is the sample mean,

s is the sample standard deviation, and

K is a multiplier factor that is chosen based on the evaluation schedule (nE), number of constituents (nc), number of wells (nw), number of background observations (n), overall SWFPR, and the specific retesting scheme selected.

For constituents such as pH, which require both lower and upper prediction limits, equation (2) is used:

$$LPL, UPL = \overline{x} \pm Ks \tag{2}$$

Table 4 presents the background (compliance) limits for each Appendix-III constituent derived from the equations above. For selected constituents exhibiting trends during background period, the background data were detrended before determining the background levels. As shown in Table 4, the constituents in which trends will be accounted for include boron, calcium, and TDS at well LPLF-2R; chloride, sulfate, and TDS at well LPLF-7R; and calcium, sulfate, and TDS at well LPLF-8. For the cases listed as 'no' for trend removal, the UPLs and lower prediction levels are the fixed compliance values to directly compare against future detection monitoring data to determine a SSI above compliance, and will be the levels to use until background is updated in the future. However, for cases listed as 'yes' for trend removal, the UPL is a calculated value dependent on time of sampling using equation (3) as follows:

Trend accounting UPL = Intercept + 
$$slope^*(time, in days) + residual value$$
 (3)

Note that the trendline equations and variables for intercept, slope, time, and residual values are shown in Table 4; these UPLs are listed as 'calculated' as they are dependent upon the time when the compliance data were obtained. The time (in days) is assumed as the number of days starting from the initial background event (which was collected on November 14, 2017) to when the compliance data in question were collected (example May 30, 2018, which is 562 days following the initial event on November 14, 2017). For TDS at well LPLF-2R, transformation was performed using the Tukey power transformation to convert it into a normal distribution before applying the simple regression to determine an appropriate relationship for trend removal.

#### 4.3 Statistical Evaluation Results

Table 5 summarizes the monitoring results determined to be confirmed SSI after retesting and therefore identified for further evaluation. The 2018 groundwater monitoring results were less than or within the respective compliance limits, except for the following five cases:

- Boron in LPLF-2R
- Calcium in LPLF-2R
- Total dissolved solids (TDS) in LPLF-2R
- Chloride in LPLF-7R

Resampling and confirmation testing was conducted within 90 days after receipt of monitoring results and evaluated for potential detection or applicability of an alternative source demonstration (note that sulfate in LPLF-8 was higher than the confirmation limit but was not confirmed in the subsequent resampling and retesting, as was sulfate in LPLF-2R). It was determined that an alternative source demonstration was appropriate and was conducted for these cases. Section 5 discusses the alternative source demonstration and applicability to these confirmed SSI results. It is anticipated that these results will be included in a review of site conditions and groundwater quality variability under changing groundwater elevations.

## **Alternative Source Demonstration**

This section presents an alternative source demonstration in response to the confirmed SSIs in accordance with 40 CFR Part 257.94(e)(2).

## 5.1 CCR Rule Regulatory Applicability

In accordance with 40 CFR Part 257.94(e)(2), the site owner has the option to demonstrate that a source other than the regulated unit (ash waste in the LPLF) caused the SSI exceeding background levels before automatically shifting into the assessment phase requirements. The CCR regulations cite examples of alternative sources causing SSIs (for example, error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality).

The CCR regulations require alternative source demonstrations to be certified by a PE and completed within 90 days following determination of a valid SSI. The retesting results for the Spring 2018 event were validated on September 6, 2018, which is interpreted as the start of the 90-day period to complete the alternative source demonstration (or the need to shift into assessment monitoring if a successful demonstration is not made). An alternative source demonstration was completed and posted to the publicly available website in October 2018. The monitoring results for the Fall 2018 event were validated December 20, 2018, with this demonstration section of the 2018 annual report provided by January 31, 2019.

#### 5.2 Alternative Source Demonstration

This section presents the technical basis and documentation to support that natural variation in groundwater quality is the reason for the SSIs observed in monitoring wells LPLF-2R and LPLF-7R at the LPLF site.

#### 5.2.1 Site History

The hydrogeological setting of the LPLF is unique in that present-day subsurface conditions were constructed such that surface overburden soils (mine spoils) were excavated during active mining operations in 2006 to expose coal seams within the relatively fine-grained Skookumchuck formation. As part of reclamation efforts following coal mining activities, the mine spoils were backfilled into a pit that includes the present-day footprint of the LPLF. Recharge via precipitation created a shallow zone of saturation within the mine spoils immediately overlying the fine-grained Skookumchuck formation, which is the target groundwater monitoring zone as described in the *Coal Combustion Residual Groundwater Monitoring System Certification for the Limited Purpose Landfill at the Centralia Mine Site near Centralia, Washington* (CH2M, 2017b). The mine spoils are generally characterized as light tan to brown silty loam to silty clay with sand lenses; the underlying Skookumchuck is characterized as a sequence of siltstones, claystones, coal seams, and occasional carbonaceous shales. The stratigraphic sequence beneath the center of the LPLF consists of approximately 80 feet of mine spoils, underlain by relatively thick sequence of fine-grained Skookumchuck, estimated at over 500 feet thick in the area.

The mine spoils were generated by removal of coal seam interburdens and placed back into the mined pit. The interburden comprised silt and claystones with stringers of sub-economical coal stringers. The backfill placement resulted in a highly heterogeneous spoil of pulverized silt and claystone as discrete and localized coal and pyritic debris mixed laterally and vertically. These gravel to cobble sized materials can be acid forming and generate localized suppressed pH in the otherwise alkaline silt and clay spoils, and secondary mobilization of calcium, sulfate and other constituents, subsequently increasing TDS in groundwater.

The presence of acid-forming materials in the spoils can result in elevated TDS and associated dissolved constituents in groundwater with localized increases closer to the material. As groundwater fluctuates, this can either submerge previously unsaturated material or expose saturated material to aerobic conditions in the unsaturated zone. The vertical heterogeneity of these materials results in groundwater conditions that can be highly variable for constituents susceptible to mobilization under suppressed pH conditions within localized areas, within a specific monitoring location.

Prior to the CCR regulations that were enacted in April 2015, TCM characterized the hydrogeological conditions for the LPLF as documented in Section 2 of TransAlta Centralia Mining LLC, Limited Purpose Landfill Solid Waste Permit Application, dated October 2008 (CH2M, 2008). To satisfy Chapter 173-350-500 (Limited Purpose Landfill) Washington Administrative Code (WAC) regulations, TCM initiated background monitoring prior to waste placement from 2007 to present, as described in the Washington State Department of Ecology (Ecology) and Lewis County Environmental Health District-approved Groundwater Monitoring Plan for TransAlta Centralia Mining LLC Limited Purpose Landfill, Amendment 1, July 2011 (CH2M, 2011a). Since 2010, TCM has prepared quarterly and annual groundwater monitoring – Data Analysis, Notification, and Reporting. To date, the WAC program remains under detection-phase monitoring status. The existing WAC data collected from 2007 to 2009 pre-date waste placement into the LPLF and are used to document the heterogenous nature of background conditions. The data are presented in the Section 5.2.2 in support of the alternative source demonstration for the CCR program.

#### 5.2.2 Background Monitoring Results

The *TransAlta Centralia Mining Fourth Quarter 2010 Groundwater Monitoring Report* (CH2M, 2011b), provided in the previously submitted Spring 2018 Alternative Source Demonstration uploaded to the publicly available website, discusses specific to the WAC program and includes descriptive statistics (via Appendix B of the 2010 report) collected during the period from 2007 to 2009, which represents site conditions of the mine spoils prior to when wastes were placed into the LPLF (effectively considered as background conditions). The WAC program included data for the same CCR constituents in question to support this alternative source demonstration.

Table 3 of the 2010 report summarizes the background data obtained from 2007 to 2009 via WAC program for boron, calcium, chloride, and TDS, which are the four constituents that are considered SSIs under the CCR program as described in Section 4 and Table 5 of this report. The results of the 2010 report illustrate WAC data for calcium in background higher than the chloride concentration of 8.4 detected in LPLF-7R in the fall groundwater monitoring. The 2010 report also shows variability and groundwater concentrations in background higher for boron, calcium, sulfate, and TDS in comparison to the CCR program SSI values at LPLF-2R. This comparative analysis to background conditions demonstrates (1) substantial spatial variability and heterogeneity in these constituents of interest, and (2) that the CCR values that were identified as SSIs are actually within the demonstrated range of natural variation in groundwater quality during the WAC background period.

In response to the onset of CCR Rule in April 2015, TCM installed monitoring wells, initiated the detection-monitoring program, and completed the eight required background monitoring events to establish background conditions and to select an appropriate statistical method by the October 17, 2017 deadline. The duration of when the CCR Rule was effective to initial reporting of detection monitoring limits constrains the background monitoring period to approximately one full hydrological season. Although the (minimum) number of background monitoring events were satisfied per CCR Rule, it is inferred that the background monitoring period (limited to about 1 year) may not have fully captured the actual natural variation that might be expected to occur in the spoils and under natural groundwater recharge and fluctuations. The natural groundwater environment can vary from changes in annual precipitation (recharge) and related geochemical changes associated with residence time within the

aquifer materials. Background monitoring events conducted over several years or multiple hydrological cycles would more appropriately characterize the natural variability in groundwater and yield more data to strengthen statistical power of detection monitoring analyses. Given these considerations, it is believed that the background limits for the CCR program have not fully captured the natural variation in groundwater quality at the LPLF site, and future such alternative source demonstrations may be expected.

As noted in the statistical method certification (CH2M, 2017a) and in accordance with Unified Guidance (EPA, 2009), it is recommended to update background conditions following four to eight sampling events because of the complex behavior of groundwater and the need for sufficiently large sample sizes. Using this principle with semiannual sampling as prescribed under the CCR program, the background values should be reviewed and updated using statistical analysis every 2 to 4 years, assuming no confirmed statistically significant increase is identified. In addition, if hydrogeologic conditions change, then background should be updated to match the latest conditions.

#### 5.3 Summary

Key findings as provided in this alternative source demonstration are summarized as follows:

- 2018 Monitoring and Retesting was conducted in compliance with the CCR program and resulted in confirmed SSI values based on the current CCR program statistical method.
- These values were evaluated and qualified as unrelated to the LPLF waste materials and related to natural variation in groundwater quality within the saturated backfilled spoils.
- These findings are consistent with similar demonstration for the CCR program in previous groundwater monitoring results at the site.
- The CCR program remains under the detection-phase monitoring status per 40 CFR 257.94, *Detection Monitoring Program.*

## Summary

Key findings developed and/or confirmed from the 2018 annual groundwater report are summarized as follows:

- The groundwater elevations measured during the compliance monitoring events were used to develop a site hydrograph, potentiometric surface, inferred groundwater flow direction, and calculated groundwater flow velocity for the spring and fall monitoring events in 2018.
- Groundwater flow directions, gradients, and flow velocities were consistent with historical measurements, with groundwater elevations showing a decrease over 2018 at the site.
- Groundwater monitoring results for compliance constituents met the compliance limits except for three parameters in monitoring well LPLF-2R in Spring 2018, and four parameters, one in well LPLF-7 and three in well LPLF-2R in Fall 2018.
- The confirmed SSI's were evaluated and demonstrated to be a source other than the regulated unit (ash landfill) and remains in detection phase monitoring.
- Based on groundwater site conditions, the additional groundwater monitoring results will be reviewed and evaluated for the compliance limits using the selected statistical methodology.

## References

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CH2M HILL Engineers, Inc. (CH2M). 2016b. Groundwater Monitoring Sampling and Analysis Plan for the Limited Purpose Landfill at the TransAlta Centralia Mine LLC.

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Fetter, C.W. 1994. Applied Hydrogeology, Third Edition.

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Tables

#### Table 1. Groundwater Monitoring Well Network

|         |                   | Coordinate | s in NAD27 <sup>1</sup> |                        | Reference Point        | Well Scree | n Elevation <sup>2</sup> | Sand Pack | Elevation <sup>2</sup> |                    |              |                       |
|---------|-------------------|------------|-------------------------|------------------------|------------------------|------------|--------------------------|-----------|------------------------|--------------------|--------------|-----------------------|
|         |                   |            |                         | Top of Casing          | Top of Ground          |            |                          |           | Well                   |                    |              |                       |
| Well    | Installation Date | Northing   | Easting                 | Elevation <sup>2</sup> | Elevation <sup>2</sup> | Тор        | Bottom                   | Тор       | Bottom                 | Depth <sup>3</sup> | Aquifer Unit | Hydraulic Designation |
| LPLF-1  | October 2007      | 520,881.45 | 1,420,272.06            | 347.80                 | 344.58                 | 305.58     | 285.58                   | 309.58    | 282.58                 | 59                 | Mine Spoils  | Up or Cross-Gradient  |
| LPLF-5  | August 2008       | 521,931.70 | 1,419,921.73            | 359.90                 | 357.88                 | 349.88     | 344.88                   | 351.38    | 343.38                 | 13                 | Mine Spoils  | Upgradient            |
| LPLF-8  | August 2008       | 521,235.37 | 1,419,233.53            | 298.75                 | 296.93                 | 279.93     | 274.93                   | 282.93    | 273.93                 | 22                 | Mine Spoils  | Downgradient          |
| LPLF-2R | July 2016         | 521,561.20 | 1,419,130.52            | 296.04                 | 293.86                 | 10.0       | 263.9                    | 275.86    | 262.36                 | 31                 | Mine Spoils  | Downgradient          |
| LPLF-7R | July 2016         | 521,180.82 | 1,419,531.95            | 299.00                 | 297.04                 | 279.7      | 269.7                    | 282.04    | 269.04                 | 28                 | Mine Spoils  | Downgradient          |

2018 Annual Groundwater Monitoring Report for Limited Purpose Landfill - TransAlta Centralia Mine LLC

#### **General Notes:**

1. Well LPLF-1 is low yield and sampled via bailer.

#### Column Header Footnotes:

<sup>1</sup>Washington State Plane Coordinates (NAD27).

<sup>2</sup>All elevations in feet above mean sea level (NGVD29).

<sup>3</sup>Well depth is feet below ground surface (rounded to nearest foot)

#### Table 2. Groundwater Elevations and Field Parameters

2018 Annual Groundwater Monitoring Report for Limited Purpose Landfill - TransAlta Centralia Mine LLC

|         |          | Reference |          |             | ,    |     |           | Oxidation |              |           |                       |                         |                                      |
|---------|----------|-----------|----------|-------------|------|-----|-----------|-----------|--------------|-----------|-----------------------|-------------------------|--------------------------------------|
|         |          | Point     | Depth to | Groundwater |      |     | Dissolved | Reduction |              |           |                       |                         |                                      |
|         | Date     | Elevation | Water    | Elevation   | Temp |     | Oxygen    | Potential | Conductivity | Turbidity |                       |                         |                                      |
| Well    | Sampled  | (ft)      | (ft btc) | (ft)        | (°C) | рН  | (mg/L)    | (mV)      | (uS/cm)      | (NTU)     | Hydraulic Designation | Hydrostratigraphic Unit | Comments                             |
| LPLF-1  | 5/30/18  | 347.80    | 57.51    | 290.29      | 12.6 | 6.5 | 1.65      |           | 3,171        | 110.5     | Up or Cross Gradient  | Backfill/Mine Spoils    | Sampled via bailer - slow recharge   |
| LPLF-1  | 10/24/18 | 347.80    | 58.08    | 289.72      | 13.0 | 6.7 | 1.51      |           | 3,300        | 128.9     | Up or Cross Gradient  | Backfill/Mine Spoils    | Sampled via bailer - slow recharge   |
| LPLF-5  | 5/30/18  | 359.90    |          |             | 13.8 | 6.6 | 3.66      |           | 2,016        | 5.9       | Upgradient            | Backfill/Mine Spoils    | Sampled via bailer, WL not recorded. |
| LPLF-5  | 10/24/18 | 359.90    | NA       |             |      |     |           |           |              |           | Upgradient            | Backfill/Mine Spoils    | Dry/no water in well. Not sampled.   |
| LPLF-8  | 5/30/18  | 298.75    | 11.18    | 287.57      | 15.1 | 5.7 | 0.95      |           | 3,797        | 1.5       | Downgradient          | Backfill/Mine Spoils    |                                      |
| LPLF-8  | 8/9/18   | 298.75    | 12.12    | 286.63      | 14.7 | 6.0 | 0.82      |           | 3,557        |           | Downgradient          | Backfill/Mine Spoils    |                                      |
| LPLF-8  | 10/24/18 | 298.75    | 14.54    | 284.21      | 13.6 | 6.1 | 0.93      |           | 3,805        | 3.4       | Downgradient          | Backfill/Mine Spoils    |                                      |
| LPLF-2R | 5/30/18  | 296.04    | 3.11     | 292.93      | 15.1 | 6.1 | 0.48      | 24        | 3,835        | 6.3       | Downgradient          | Backfill/Mine Spoils    |                                      |
| LPLF-2R | 8/9/18   | 296.04    | 4.75     | 291.29      | 15.1 | 5.8 | 0.87      |           | 3,855        |           | Downgradient          | Backfill/Mine Spoils    |                                      |
| LPLF-2R | 10/24/18 | 296.04    | 5.81     | 290.23      | 13.5 | 6.1 |           |           | 3,985        | 1.5       | Downgradient          | Backfill/Mine Spoils    |                                      |
| LPLF-2R | 1/7/19   | 296.04    | 4.98     | 291.06      | 13.4 | 6.2 | 0.81      |           | 3,921        | 1.3       | Downgradient          | Backfill/Mine Spoils    |                                      |
| LPLF-7R | 5/30/18  | 299.00    | 19.71    | 279.29      | 14.6 | 6.0 | 0.81      | 137       | 2,883        | 1.2       | Downgradient          | Backfill/Mine Spoils    |                                      |
| LPLF-7R | 10/24/18 | 299.00    | 21.34    | 277.66      | 12.7 | 6.0 | 0.84      |           | 2,933        | 2.9       | Downgradient          | Backfill/Mine Spoils    |                                      |
| LPLF-7R | 1/7/19   | 299.00    | 20.98    | 278.02      | 12.9 | 6.0 | 0.90      |           | 2,865        | 1.4       | Downgradient          | Backfill/Mine Spoils    |                                      |
|         |          |           |          |             |      |     |           | Water Le  | vels Only    |           |                       | 1                       |                                      |
| LPLF-3  | 5/30/18  | 295.64    | 7.53     | 288.11      |      |     |           |           |              |           | Cross-Gradient        | Backfill/Mine Spoils    |                                      |
| LPLF-3  | 10/24/18 | 295.64    | 9.25     | 286.39      |      |     |           |           |              |           | Cross-Gradient        | Backfill/Mine Spoils    |                                      |
| LPLF-4  | 5/30/18  | 303.12    | 3.57     | 299.55      |      |     |           |           |              |           | Cross-Gradient        | Backfill/Mine Spoils    |                                      |
| LPLF-4  | 10/24/18 | 303.12    | 7.41     | 295.71      |      |     |           |           |              |           | Cross-Gradient        | Backfill/Mine Spoils    |                                      |

Notes:

" -- " = Not applicable, not available, and/or not measured.

Reference point elevation is top of PVC casing; all elevations are in feet above mean sea level (NAVD88).

Field parameter readings represent final stabilized readings obtained during low-flow purge immediately prior to collection of water-quality sample

ft = feet

ft btc = feet below top of casing

C = degrees celcius

mg/L = milligrams per liter

mV = millivolts

uS/cm = microsiemens per centimeter

NTU = Nephelometric Turbidity Units

#### Table 3. Groundwater Analytical Summary

2018 Annual Groundwater Monitoring Report for the Limited Purpose Landfill - TransAlta Centralia Mine LLC

| Well                   |            |       | LPLF-1               | LPLF-5           | LPLF-8           | LPLF-2R           | LPLF-7R           | LPLF-8           | LPLF-2R           | LPLF-1               | LPLF-8           | LPLF-2R           | LPLF-7R           | LPLF-2R      | LPLF-7R      |
|------------------------|------------|-------|----------------------|------------------|------------------|-------------------|-------------------|------------------|-------------------|----------------------|------------------|-------------------|-------------------|--------------|--------------|
| Sample ID              |            |       | 053018-CCR-LPLF1     | 053018-CCR-LPLF5 | 053018-CCR-LPLF8 | 053018-CCR-LPLF2R | 053018-CCR-LPLF7R | 080918-CCR-LPLF8 | 080918-CCR-LPLF2R | 102418-CCR-LPLF1     | 102418-CCR-LPLF8 | 102418-CCR-LPLF2R | 102418-CCR-LPLF7R |              |              |
| Sample Date            |            |       | 5/30/2018            | 5/30/2018        | 5/30/2018        | 5/30/2018         | 5/30/2018         | 8/9/2018         | 8/9/2018          | 10/24/2018           | 10/24/2018       | 10/24/2018        | 10/24/2018        | 1/7/2019     | 1/7/2019     |
| Hydraulic Designation  |            |       | Up or Cross Gradient | Upgradient       | Downgradient     | Downgradient      | Downgradient      | Downgradient     | Downgradient      | Up or Cross Gradient | Downgradient     | Downgradient      | Downgradient      | Downgradient | Downgradient |
| Analyte                | Method     | Units |                      |                  |                  |                   |                   |                  |                   |                      |                  |                   |                   |              |              |
| Boron                  | EPA 6010C  | mg/L  | 0.559                | 0.099            | 0.936            | 0.351             | 0.32              | -                | 0.325             | 0.561                | 0.94             | 0.329             | 0.34              | 0.332        | -            |
| Calcium                | EPA 6010C  | mg/L  | 211                  | 335              | 430              | 499 J(MS)         | 205               | -                | 463               | 185                  | 364              | 475               | 196 J(MS)         | 456          | -            |
| Chloride               | EPA 9056A  | mg/L  | 29.1                 | 3.1              | 7.2              | 8.3               | 7.5               | -                | -                 | 2.4                  | 6.9              | 8.3               | 8.4               | -            | 9.23         |
| Fluoride               | EPA 9056A  | mg/L  | 2 U                  | 2 U              | 2 U              | 2 U               | 2 U               | -                | -                 | 2 U                  | 2 U              | 2 U               | 2 U               | -            | -            |
| рН                     | SM 4500H B | unit  | 6.88 J(H)            | 7.36 J(H)        | 6.15 J(H)        | 6.6 J(H)          | 6.57 J(H)         | -                | -                 | 6.73 J(H)            | 6.02 J(H)        | 6.41 J(H)         | 6.46 J(H)         | -            | -            |
| Sulfate                | EPA 9056A  | mg/L  | 1,320                | 665              | 3,670            | 1,880             | 1,510             | 2,520            | -                 | 1,430                | 2,530            | 2,120             | 1,220             | 1630         | -            |
| Total Dissolved Solids | SM 2540C   | mg/L  | 2,490                | 1600             | 3,540            | 3,490             | 2,260             | -                | 3,480             | 2,610                | 3,720            | 3,680             | 2,430             | 3320         | -            |

#### Notes:

Field parameters represent final stabilized readings obtained during sampling immediately prior to sample collection.

Non-detect values reported as "U" with the laboratory method detection limit; "J" is estimated value as determined from data validation.

(H) for outside holding time for sample

(MS) for matrix spike recovery outside range (FD) Field Duplicate outside relative percentage difference

Acronyms:

Data qualifiers: U = non-detect value, J = estimated value.

C = degrees celcius

mg/L = milligrams per liter

mV = millivolts

uS/cm = microsiemens per centimeter

NTU = Nephelometric Turbidity Units

#### Table 4 Statistical Method and Compliance Limits

2018 Annual Groundwater Monitoring Report for the Limited Purpose Landfill - TransAlta Centralia Mine LLC

|            |                    | Trending Calculated UCL | (if needed) = { Interco |                | Lower<br>Prediction<br>Levels | Upper<br>Prediction<br>Levels |          | Calculated Upper Prediction Limits<br>(compliance values) |       |            |            |           |                 |           |          |            |          |
|------------|--------------------|-------------------------|-------------------------|----------------|-------------------------------|-------------------------------|----------|---|-------|------------|------------|-----------|-----------------|-----------|----------|------------|----------|
| Well       | Constituent        | Units                   | Method                  | Trend Removal  | Intercept                     | Slope                         | Residual | K-Value   | (LPL) | (UPL)      |            | 10/5/2017 | 2/28/2018       | 5/30/2018 | 8/9/2018 | 10/24/2018 | 1/7/2019 |
| LPLF-2R    | Boron              | mg/L                    | Parametric UPL          | Yes            | 0.3617368                     | -0.0001758                    | 0.0181   | 2.4   |       | Calculated |            | 0.323     | 0.297           | 0.281     | 0.269    | 0.255      | 0.242    |
| LPLF-2R    | Calcium            | mg/L                    | Parametric UPL          | Yes            | 495.1875                      | -0.2273                       | 36.37    | 2.4   |       | Calculated |            | 458       | 424             | 404       | 388      | 370        | 353      |
| LPLF-2R    | Chloride           | mg/L                    | Parametric UPL          | No             |                               |                               |          | 2.4   |       | 9.77       |            |           |                 |           |          |            |          |
| LPLF-2R    | Fluoride           | mg/L                    | DQR                     | No             |                               |                               |          |   |       | DQR        |            |           |                 |           |          |            |          |
| LPLF-2R    | рН                 | pH units                | Parametric UPL          | No             |                               |                               |          | 2.79  | 6.08  | 6.86       |            |           |                 |           |          |            |          |
| LPLF-2R    | Sulfate            | mg/L                    | Parametric UPL          | No             |                               |                               |          | 2.4   |       | 2010       |            |           |                 |           |          |            |          |
| LPLF-2R    | TDS                | mg/L                    | Non-Parametric UPL      | Yes            | 3718.1393                     | -0.9717                       | 35       | 2.4   |       | Calculated |            | 3437      | 3295            | 3207      | 3138     | 3064       | 2991     |
| LPLF-7R    | Boron              | mg/L                    | Parametric UPL          | No             |                               |                               |          | 2.4   |       | 0.427      |            |           |                 |           |          |            |          |
| LPLF-7R    | Calcium            | mg/L                    | Parametric UPL          | No             |                               |                               |          | 2.4   |       | 223        |            |           |                 |           |          |            |          |
| LPLF-7R    | Chloride           | mg/L                    | Parametric UPL          | No*            |                               |                               |          | 2.4   |       | 7.94*      |            | 7.44      |                 |           |          |            |          |
| LPLF-7R    | Fluoride           | mg/L                    | DQR                     | No             |                               |                               |          |   |       | DQR        |            |           |                 |           |          |            |          |
| LPLF-7R    | рН                 | pH units                | Parametric UPL          | No             |                               |                               |          | 2.79  | 6.06  | 6.98       |            |           |                 |           |          |            |          |
| LPLF-7R    | Sulfate            | mg/L                    | Parametric UPL          | Yes            | 718                           | 3.197                         | 170.01   | 2.4   |       | Calculated |            | 1927      | 2394            | 2685      | 2912     | 3155       | 3394     |
| LPLF-7R    | TDS                | mg/L                    | Parametric UPL          | Yes            | 1560                          | 4.448                         | 278.43   | 2.4   |       | Calculated |            | 3284      | 3933            | 4338      | 4654     | 4992       | 5326     |
| LPLF-8     | Boron              | mg/L                    | Parametric UPL          | No             |                               |                               |          | 2.4   |       | 0.988      |            |           |                 |           |          |            |          |
| LPLF-8     | Calcium            | mg/L                    | Parametric UPL          | Yes            | 363.94062                     | 0.07846                       | 33.96    | 2.4   |       | Calculated |            | 423       | 435             | 442       | 448      | 454        | 459      |
| LPLF-8     | Chloride           | mg/L                    | Parametric UPL          | No             |                               |                               |          | 2.4   |       | 7.39       |            |           |                 |           |          |            |          |
| LPLF-8     | Fluoride           | mg/L                    | DQR                     | No             |                               |                               |          |   |       | DQR        |            |           |                 |           |          |            |          |
| LPLF-8     | рН                 | pH units                | Parametric UPL          | No             |                               |                               |          | 2.79  | 5.61  | 6.36       |            |           |                 |           |          |            |          |
| LPLF-8     | Sulfate            | mg/L                    | Parametric UPL          | Yes            | 1989.33                       | 2.482                         | 123.75   | 2.4   |       | Calculated |            | 2920      | 3282            | 3508      | 3684     | 3873       | 4059     |
| LPLF-8     | TDS                | mg/L                    | Parametric UPL          | Yes            | 3180.934                      | 3.161                         | 71.7     | 2.4   |       | Calculated |            | 4280      | 4741            | 5029      | 5254     | 5494       | 5731     |
|            |                    |                         |                         |                |                               |                               |          |   |       |            | start date |           | days since star | :         |          |            |          |
| TIME (days | s) is the period f | rom Nov. 1              | 4, 2016 to time of com  | pliance event. |                               |                               |          |   |       |            | 11/14/2016 | 325       | 471             | 562       | 633      | 709        | 784      |

\*UPL for initial annual report calculated (detrended) with value of 7.44 mg/L; detrending method unrealisticly low and updated for 5/30/18 event to UPL of 7.94 mg/L.

#### Table 5 Summary of Compliance Value Exceedance

| Well    | Sample Date Parameter | Upper Limit (mg/L) | Sample Result (mg/L) | Resample Date | Upper Limit (mg/L) | ReTest Result (mg/L) |
|---------|-----------------------|--------------------|----------------------|---------------|--------------------|----------------------|
| LPLF-8  | 5/30/2018 Sulfate     | 3,508              | 3,670                | 8/9/2018      | 3,684              | 2,520                |
| LPLF-2R | 5/30/2018 Boron       | 0.281              | 0.351                | 8/9/2018      | 0.269              | 0.325                |
| LPLF-2R | 5/30/2018 Calcium     | 404                | 499                  | 8/9/2018      | 388                | 463                  |
| LPLF-2R | 5/30/2018 TDS         | 3,207              | 3,409                | 8/9/2018      | 3,138              | 3,480                |
| LPLF-7R | 10/24/2018 Chloride   | 7.94               | 8.4                  | 1/7/2019      | 7.94               | 9.23                 |
| LPLF-2R | 10/24/2018 Boron      | 0.255              | 0.329                | 1/7/2019      | 0.242              | 0.332                |
| LPLF-2R | 10/24/2018 Calcium    | 370                | 475                  | 1/7/2019      | 353                | 456                  |
| LPLF-2R | 10/24/2018 Sulfate    | 2,010              | 2,120                | 1/7/2019      | 2,010              | 1,630                |
| LPLF-2R | 10/24/2018 TDS        | 3,060              | 3,680                | 1/7/2019      | 2,991              | 3,320                |

2018 Annual Groundwater Monitoring Report for the Limited Purpose Landfill - TransAlta Centralia Mine LLC

Notes:

Bold parameters indicate calculated limits

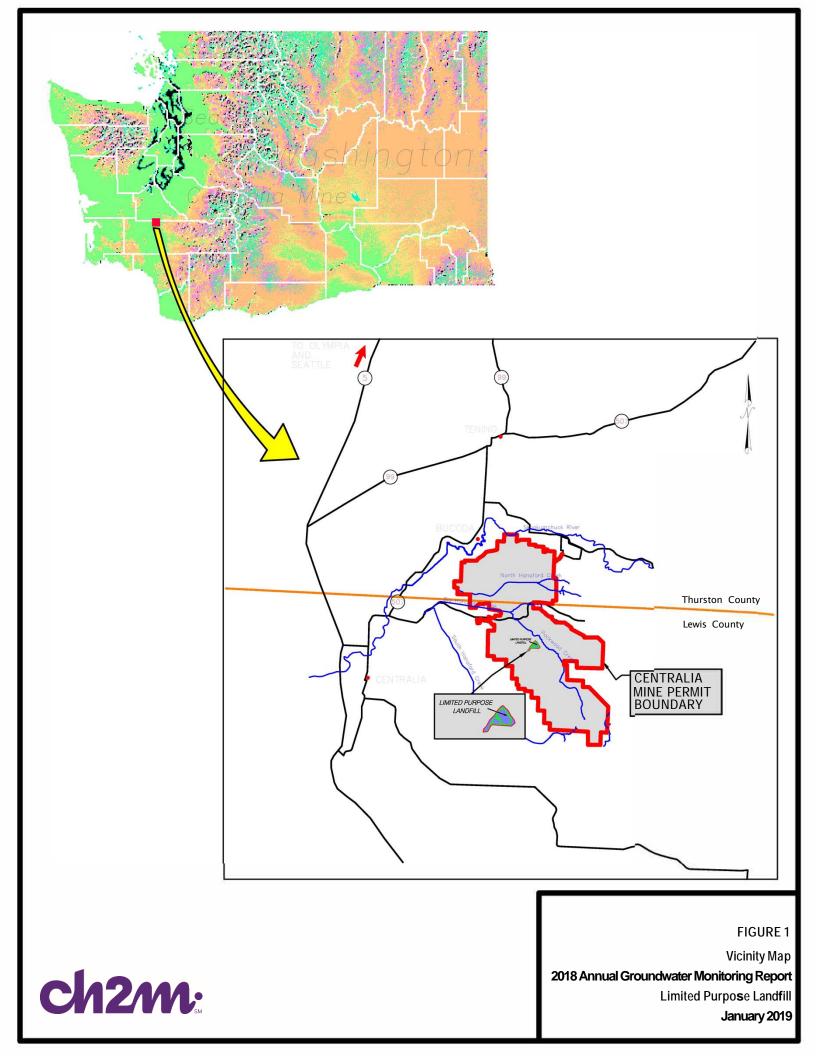
Four results were retested from 5/30/2018 sampling event

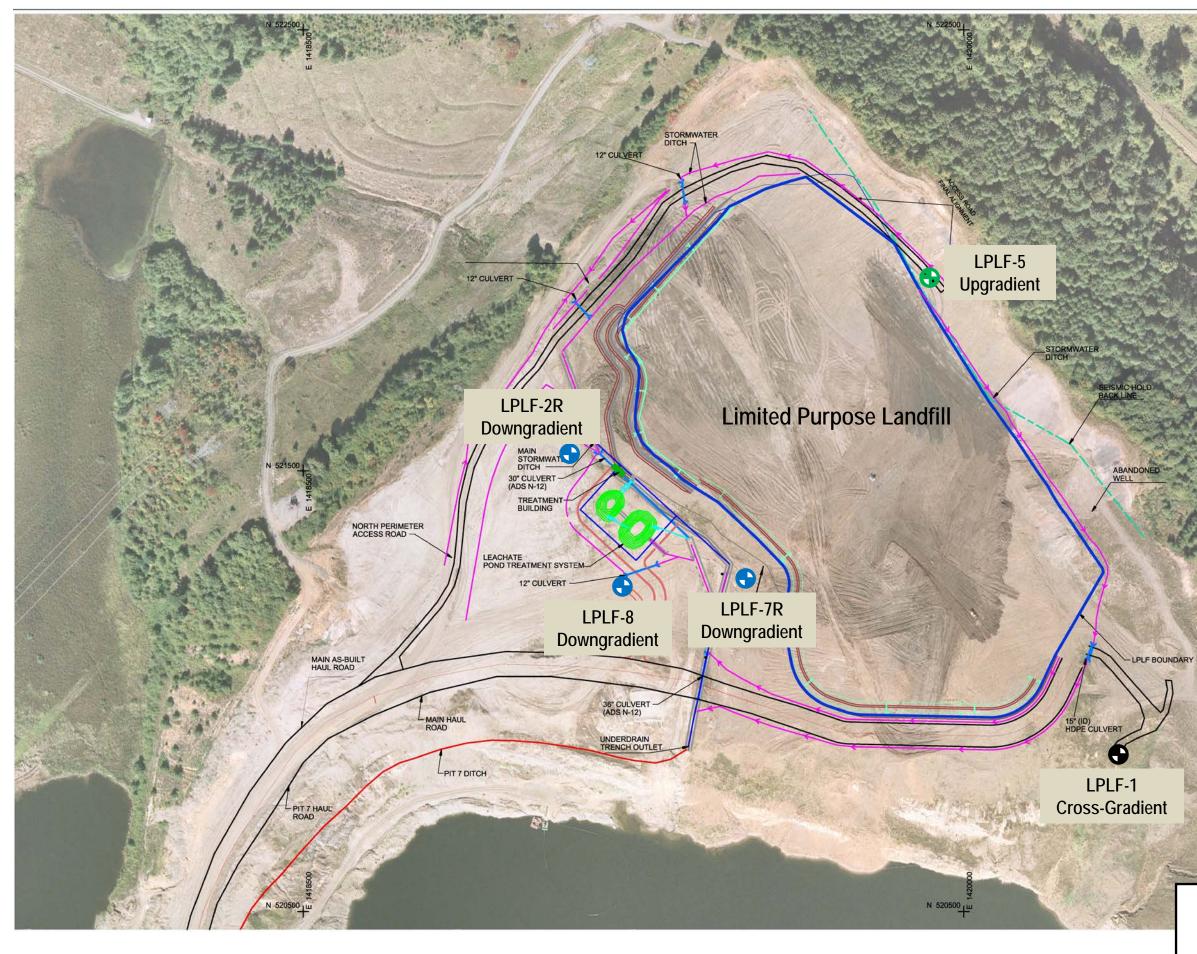
Three retests results (highlighted yellow) were confirmed as statistically-significant exceedances for evaluation.

Five results were retested from 10/24/2018 sampling event

TBD retests (highlighted yellow) were confirmed as statistically significant exceedances for evaluation.

## Figures





# ch2m:



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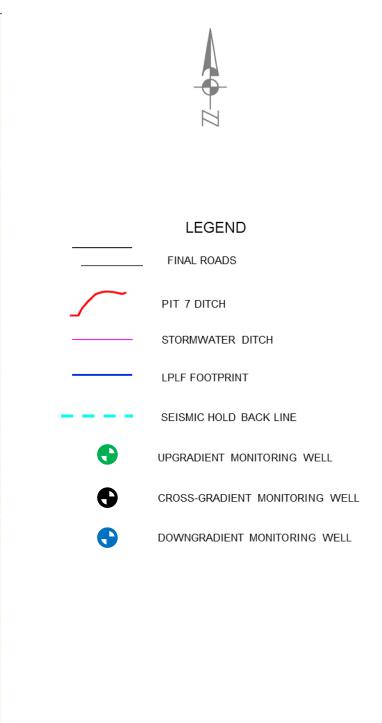
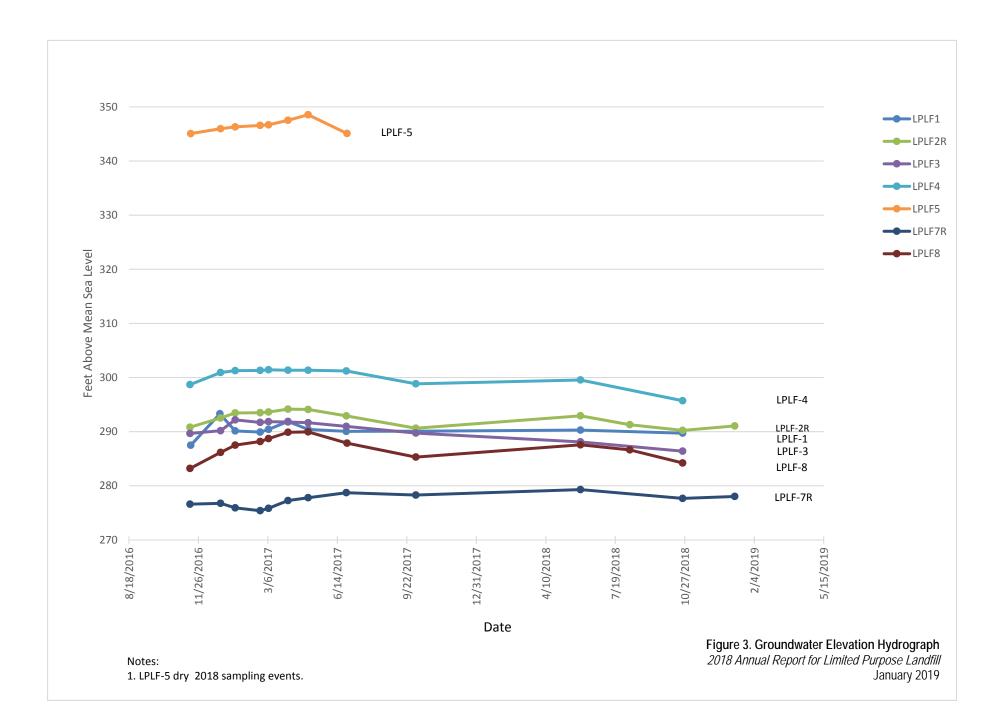
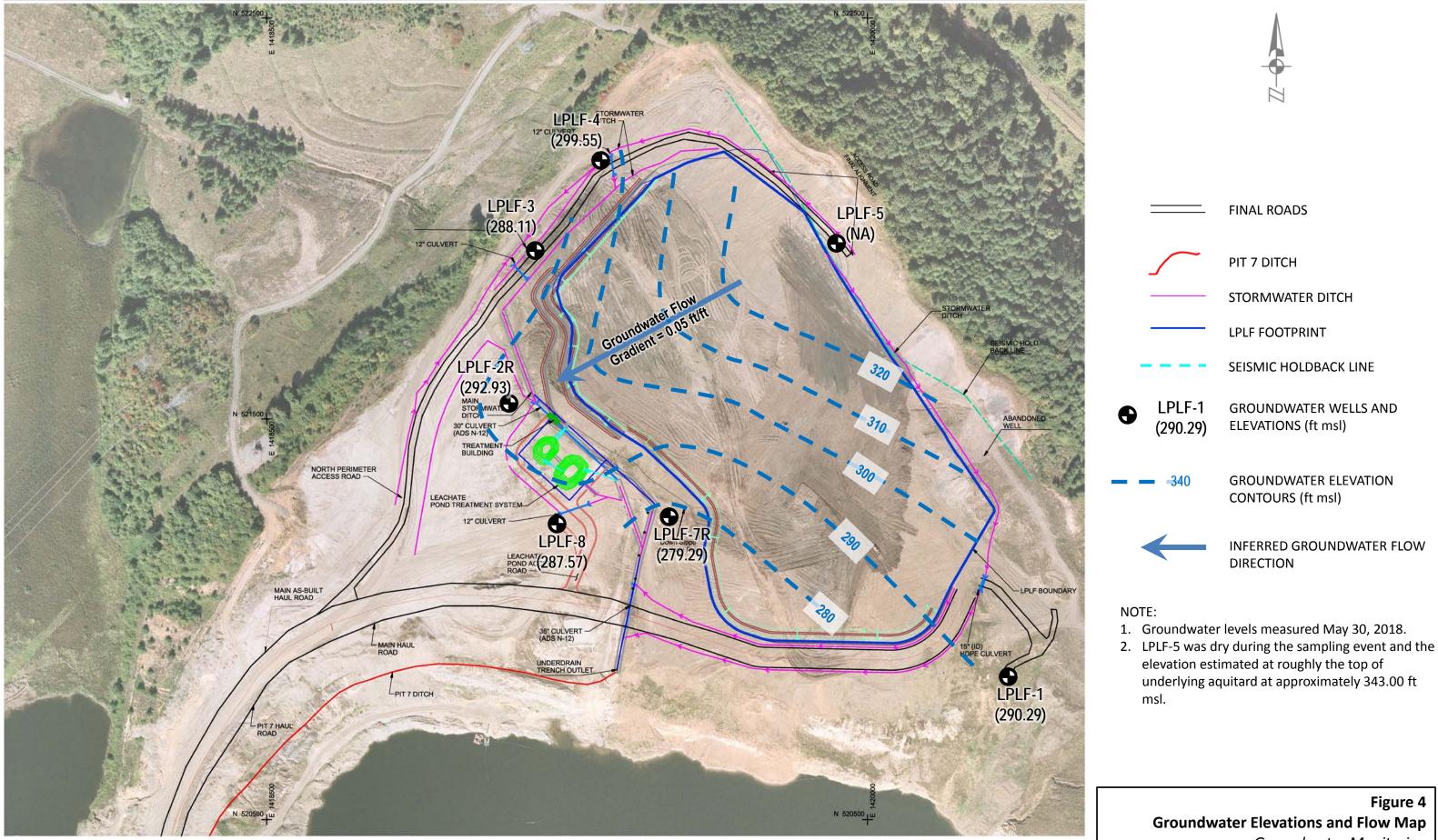
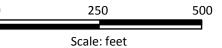


Figure 2 Site Map and Groundwater Monitoring Network 2018 Annual Report for Limited Purpose Landfill January 2019

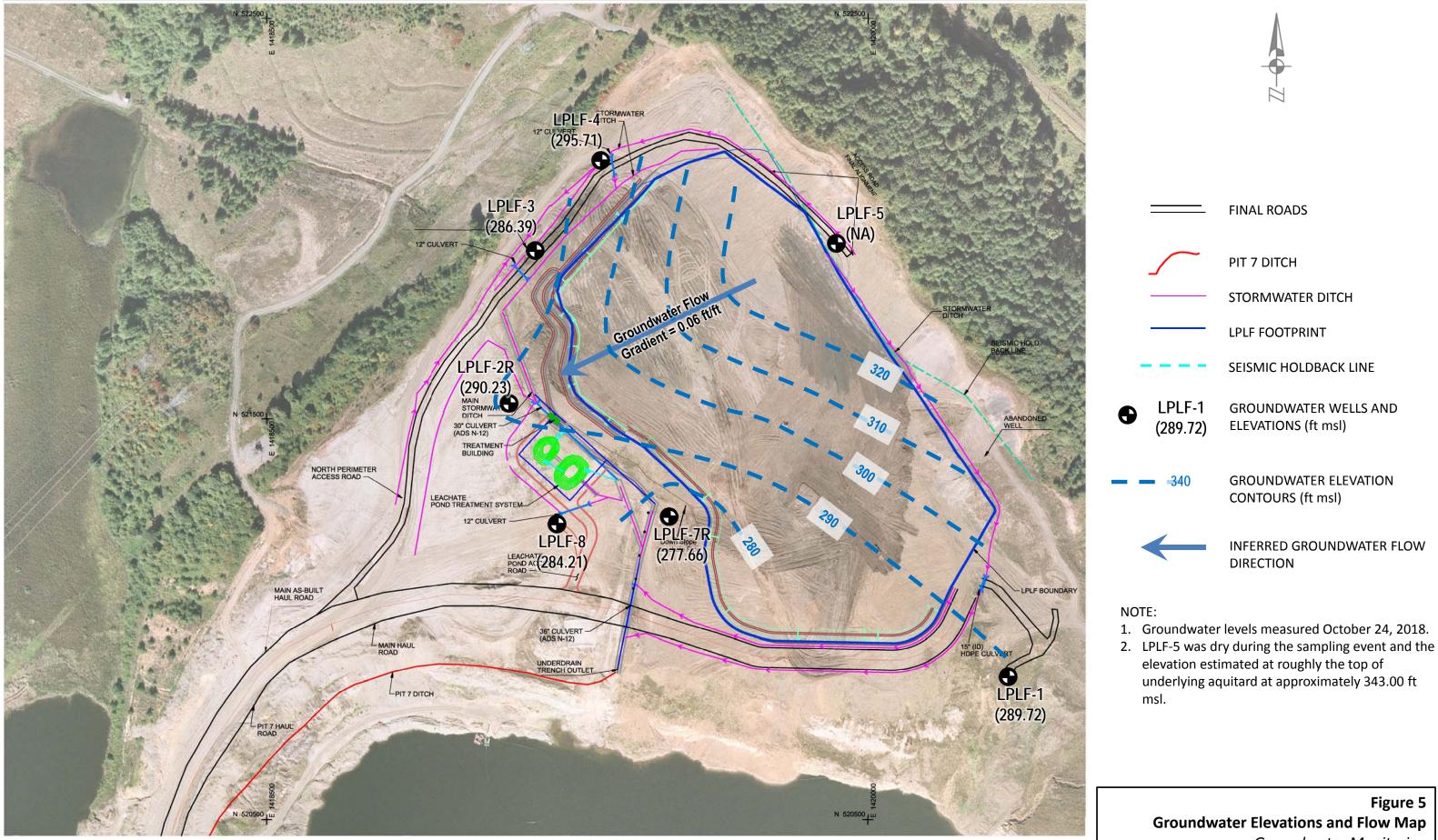




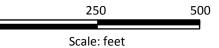
# ch2m:



## Groundwater Monitoring Limited Purpose Landfill May 30, 2018



# ch2m:



## Groundwater Monitoring Limited Purpose Landfill October 24, 2018

Appendix A Field Forms

|                       |                  |          | 610                | unuwater       | Furging              | and Sam   | iping ro     |             |                    |                        |
|-----------------------|------------------|----------|--------------------|----------------|----------------------|---|--------------|-------------|--------------------|------------------------|
| SITE:                 | ТСМ І            | PLI      | F                  | Proj           |                      | Ċ   |              |             |                    | LPLFI                  |
| Field Team:           |                  |          | Bill Scheer        | _              |                      |   |              |             | Date:              | 5/30/18                |
| Weather/Ter           |                  |          |                    |                | -                    |   |              | Arrival     | Fime to Well:      | 5/30/18<br>12:15       |
|                       |                  |          |                    |                | 🗆 Grab               | 🗹 Other: 🧕  | BAILER       | Initial DT  | W (ft btc):        | 57.5                   |
| Pump Settin           | g <sup>5</sup> : |          |                    |                | Notes:               |   |              |             |                    |                        |
|                       |                  |          |                    |                | Fiel                 | d Parameters  |              |             |                    |                        |
| Time <sup>1</sup>     | DTW <sup>2</sup> |          | Purge Vol.<br>(ml) | рН             | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L)  | Temp<br>(°C) | ORP<br>(mV) | Turbidity<br>(NTU) | Note color, odor, etc. |
|                       | Begin Pu         | Imping   |                    |                |                      |   |              |             |                    |                        |
|                       |                  |          | 2                  | 6.46           | 3171                 | 1.65  | 126          |             | 110.5              |                        |
|                       |                  |          |                    | ~              |                      |   | i Resta      |             |                    |                        |
|                       |                  |          |                    |                |                      |   |              |             |                    |                        |
|                       |                  |          |                    |                |                      |   |              |             |                    |                        |
|                       |                  |          |                    |                |                      |   |              |             |                    |                        |
|                       |                  | -        |                    |                |                      |   |              |             |                    |                        |
|                       |                  |          |                    |                |                      |   |              |             |                    |                        |
|                       |                  | _        |                    |                |                      |   |              |             |                    |                        |
|                       |                  |          |                    |                |                      |   |              |             |                    |                        |
| 1                     |                  |          |                    |                |                      |   |              |             |                    |                        |
|                       |                  |          |                    |                |                      |   |              |             |                    |                        |
|                       |                  |          |                    |                |                      |   |              |             |                    |                        |
|                       |                  |          |                    |                |                      |   |              |             |                    |                        |
|                       |                  |          |                    |                |                      |   |              |             |                    |                        |
|                       |                  |          |                    |                |                      |   |              |             |                    |                        |
| Stabilization         |                  |          |                    |                |                      |   |              |             |                    |                        |
| Criteria <sup>3</sup> |                  |          | •                  | ± 0.1 units    | ± 3%                 | ± 0.3 mg/L  |              | ± 10 mV     | ± 10% <sup>4</sup> |                        |
|                       | eved after 3 su  | occessiv | e readings for Lo  |                |                      | <sup>2</sup> DTW: Total drawo<br>ubset: pH, sp. cond. |              |             | v-Flow method      |                        |
|                       |                  |          |                    |                |                      | gavinny   |              | s           | Sample Time:       | 12:20                  |
|                       |                  |          |                    |                | de, pH, sulfate, s   |   | 3            | . ~         |                    |                        |
|                       |                  | 10       |                    | adium 226, and | 92 65 12 E           |   |              |             |                    |                        |
| C                     | Other, s         | pecify   |                    |                |                      |   |              |             |                    |                        |
| QC SAMPLE             | : [              | ] Fiel   | d Duplicate        |                | MSD 🗆                | EQ Rinsate B  | lank         | TOTAL PU    | JRGED (ml):        |                        |
| QC Sample II          | D:               |          |                    |                |                      |   |              | QC          | Sample Time:       |                        |
| Comments:             | -                |          |                    |                |                      |   |              |             |                    |                        |
|                       |                  |          |                    |                |                      |   |              |             |                    |                        |

| SITE:   | TCM LPL          | F                     | Proj          | ect Number:          | Ú                    | R  |                 | Well ID:           | LPUF-2<br>5-30-18      |
|---|------------------|-----------------------|---------------|----------------------|----------------------|--|-----------------|--------------------|------------------------|
| Field Team:                                     |                  |                       |               |                      |                      |  |                 | Date:              | 5-30-18                |
| Weather/Ter                                     | np:              | Sunt                  | MARN          | I                    |                      |  |                 |                    | 13:35                  |
|   |                  |                       |               |                      |                      |  |                 |                    | (11.9)                 |
| Pump Settin                                     | g <sup>5</sup> : |                       |               | Notes:               | 0                    |  |                 | v                  | 3                      |
|   |                  |                       |               | Fiel                 | d Parameter          |  |                 |                    |                        |
| Time <sup>1</sup>                               | DTW <sup>2</sup> | Purge Vol.<br>(ml)    | рН            | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L)         | Temp<br>(°C)                                 | ORP<br>(mV)     | Turbidity<br>(NTU) | Note color, odor, etc. |
|   | Begin Pumpin     | Q                     |               |                      |                      |  |                 |                    |                        |
|   |                  |                       |               |                      |                      |  |                 |                    |                        |
|   |                  | $\overline{}$         |               |                      |                      |  |                 |                    |                        |
|   |                  |                       |               |                      |                      |  |                 |                    |                        |
|   |                  |                       | $\rightarrow$ |                      |                      |  |                 |                    |                        |
|   |                  | P                     |               |                      |                      |  |                 |                    |                        |
|   |                  |                       |               |                      |                      |  |                 |                    |                        |
|   |                  |                       |               |                      |                      |  |                 |                    |                        |
|   |                  |                       |               |                      |                      |  |                 |                    |                        |
|   |                  |                       |               |                      | $\overline{)}$       |  |                 |                    |                        |
|   |                  |                       |               |                      |                      |  |                 |                    |                        |
|   |                  |                       |               |                      |                      | $\overline{\}$                               |                 |                    |                        |
|   |                  |                       |               |                      |                      |  |                 |                    |                        |
|   |                  |                       |               |                      |                      |  | $\overline{\ }$ |                    |                        |
|   |                  |                       |               |                      |                      |  | ``              |                    |                        |
|   |                  |                       |               |                      |                      |  |                 |                    |                        |
|   |                  |                       |               |                      |                      |  |                 |                    |                        |
| Stabilization<br>Criteria <sup>3</sup>          | •                | 1 .                   | ± 0.1 units   | ± 3%                 | ± 0.3 mg/L           |  | ± 10 mV         | ± 10% <sup>4</sup> |                        |
| COMPANY AND |                  | sive readings for Lor |               | nimum parameter s    | subset: pH, sp. cond | down should not ex<br>I., and turbidity or D |                 | v-Flow method      |                        |
| Sample ID:                                      |                  |                       |               |                      | o gavniin)           |  | ç               | Sample Time:       |                        |
|   |                  | heren estelum         |               |                      | and TDC)             |  |                 | ampie rine.        |                        |
|   | Appendix III (   | • 10 10               |               | 222 99 6             | and TDS)             |  |                 |                    |                        |
| _   | Other, specif    |                       |               |                      |                      |  |                 |                    |                        |
| QC SAMPLE                                       | : 🗆 Fie          | eld Duplicate         |               | /ISD 🗆               | EQ Rinsate E         | Blank  | TOTAL PL        | JRGED (ml):        |                        |
| QC Sample II                                    | D:               |                       | %             |                      |                      |  | QC              | Sample Time:       |                        |
| Comments:                                       |                  |                       |               |                      |                      |  | n:<br>19.02-    |                    |                        |
|   |                  |                       |               |                      |                      |  |                 |                    |                        |

| Groundwater | Purging | and | Sampling | Form |
|-------------|---------|-----|----------|------|
|-------------|---------|-----|----------|------|

| SITE:                                  | TCM LPL                                      | .F                  | Proj              | ect Number:                               | CCI                 | 2            | _                     | Well ID:           | LPLF2R                 |
|--|--|---------------------|-------------------|---|---------------------|--------------|-----------------------|--------------------|------------------------|
| Field Team:                            |  | Bill Scheer         |                   |   |                     |              | _                     |                    | 5-30-1B                |
| Weather/Te                             | mp:  | oun d               | -WARA             | ~   |                     |              | Arrival <sup>-</sup>  | Time to Well:      | 13:20                  |
| Purge Metho                            |  |                     |                   |   |                     |              | Initial DT            |                    |                        |
| Pump Settin                            | g⁵: \75                                      |                     |                   | Notes:                                    |                     |              |                       |                    |                        |
|  |  |                     |                   |   | d Parameter         | S            |                       |                    |                        |
| Time <sup>1</sup>                      | DTW <sup>2</sup>                             | Purge Vol.<br>(ml)  | рН                | Sp. Cond.<br>(uS/cm)                      | DO<br>(mg/L)        | Temp<br>(°C) | ORP<br>(mV)           | Turbidity<br>(NTU) | Note color, odor, etc. |
| 5                                      | Begin Pumpin                                 |                     |                   | (uerein)                                  | (3/=/               | ( )          | ()                    | (                  |                        |
| 10                                     | (3.19)                                       | 1250                | 6.14              | 3844                                      | 38:21               | 14.9         | 24.2                  | 61                 |                        |
| 15                                     | (3.23)                                       | 1875                |                   | 3820                                      |                     | 15.1         | 24.4                  | 5.9                |                        |
| 20                                     | (3.29)                                       | 2500                | 6.13              | 3635                                      | ,48                 | 15.1         | 24.4                  | 1.3                |                        |
|  |  |                     |                   | 0-0                                       | ,,,,                | 15.1         |                       | 6.                 |                        |
|  |  |                     |                   |   |                     |              |                       |                    |                        |
|  |  |                     |                   |   |                     |              |                       |                    |                        |
|  |  |                     |                   |   |                     |              |                       |                    |                        |
|  |  |                     |                   |   |                     |              |                       |                    |                        |
|  |  |                     |                   |   |                     |              |                       |                    |                        |
|  |  |                     |                   |   |                     |              |                       |                    |                        |
|  |  |                     |                   |   |                     |              |                       |                    |                        |
|  |  |                     |                   |   |                     |              |                       |                    |                        |
|  |  |                     |                   |   |                     |              |                       |                    |                        |
|  |  |                     |                   |   | -                   |              |                       |                    |                        |
|  |  |                     |                   |   |                     |              |                       |                    |                        |
| Stabilization<br>Criteria <sup>3</sup> | •  |                     | ± 0.1 units       | ± 3%                                      | ± 0.3 mg/L          |              | ± 10 mV               | ± 10% <sup>4</sup> |                        |
| 12.49                                  | meters in consistent<br>eved after 3 success | ive readings for Lo | w-Flow method; mi |   | ubset: pH, sp. cond |              | xceed 0.33 ft for Lov | w-Flow method      |                        |
| Sample ID:                             |  |                     | 2-LPLF2           | 2010-00-00-00-00-00-00-00-00-00-00-00-00- | gawmin)             |              | ç                     | Sample Time:       | 13:40                  |
|  | Appendix III (                               |                     |                   |   | and TDS)            |              | -                     |                    |                        |
|  | Appendix IV (                                | total metals, R     | adium 226, and    | Radium 228).                              |                     |              |                       |                    |                        |
| QC SAMPLE                              |  |                     |                   | MSD 🗆                                     |                     | Blank        | TOTAL PU              | JRGED (ml):        | 2500                   |
| QC Sample I                            | D:C  | 53018-0             | a-LPLF            | 2R  |                     |              |                       | Sample Time:       |                        |
| Comments:                              |  |                     |                   |   |                     |              | 5.5X                  |                    |                        |
|  |  |                     |                   |   |                     |              |                       |                    |                        |

| SITE:  | TCM LPI             | _F                   | Proj                               | ect Number:                       | Le                   | R             |                                 | Well ID:           | LPLF 3                 |
|--|---------------------|----------------------|------------------------------------|-----------------------------------|----------------------|---------------|---------------------------------|--------------------|------------------------|
| Field Team:  |                     | Bill Scheer          |                                    |                                   |                      | ,             |                                 |                    | 5-30-18                |
| Weather/Ter  | mp: 5               | un t                 | harm                               | $\overline{\boldsymbol{\lambda}}$ |                      |               | Arrival T                       | ime to Well:       | 13:25                  |
|  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
| Pump Settin  | g <sup>5</sup> :    |                      |                                    | Notes:                            | 4)<br>11             |               |                                 | 1                  | (7,53)                 |
|  |                     | 1821                 |                                    | Fiel                              | d Parameter          | S             |                                 |                    |                        |
| Time <sup>1</sup>  | DTW <sup>2</sup>    | Purge Vol.<br>(ml)   | рН                                 | Sp. Cond.<br>(uS/cm)              | DO<br>(mg/L)         | Temp<br>(°C)  | ORP<br>(mV)                     | Turbidity<br>(NTU) | Note color, odor, etc. |
|  | Begin Pumpir        | ng                   |                                    |                                   |                      |               |                                 |                    |                        |
|  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
|  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
| -  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
|  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
|  |                     |                      | $\overline{\}$                     |                                   |                      |               |                                 |                    |                        |
|  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
|  |                     |                      |                                    | $\overline{}$                     |                      |               |                                 |                    |                        |
|  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
|  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
|  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
|  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
|  |                     |                      |                                    | <b>6</b>                          |                      | $\rightarrow$ |                                 |                    |                        |
|  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
|  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
| Stabilization  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |
| Criteria <sup>3</sup>  | =                   | -                    | ± 0.1 units<br>s for Low-Flow meth | ± 3%                              | ± 0.3 mg/L           | -             | ± 10 mV<br>ceed 0.33 ft for Low | ± 10% <sup>4</sup> |                        |
| 12/23 Photo Contract Photo Pho | eved after 3 succes | sive readings for Lo |                                    | nimum parameter s                 | subset: pH, sp. cond |               |                                 | -riow memoo        |                        |
| Sample ID:   |                     |                      | 3                                  |                                   |                      |               | S                               | ample Time:        |                        |
| Analysis:  |                     |                      | chloride, fluorid                  |                                   |                      |               | -                               |                    |                        |
|  |                     | 15                   | adium 226, and                     |                                   |                      |               |                                 |                    |                        |
|  |                     |                      |                                    |                                   |                      | llank         |                                 |                    |                        |
| QC SAMPLE<br>QC Sample I   |                     | eld Duplicate        | □ MS/N                             | ASD 🗆                             | EQ Rinsate E         | DIANK         |                                 |                    |                        |
| Comments:  |                     |                      |                                    |                                   |                      |               | - QU                            | cample fillie:     |                        |
| ovniniento.  |                     |                      |                                    |                                   |                      |               |                                 |                    |                        |

| SITE:  | TCM LPI                                     | F  | Proje                                     | ect Number:              | CCI          | 2            |                      | Well ID:           | LPLF 4<br>5-30-18      |
|--|---|--|---|--------------------------|--------------|--------------|----------------------|--------------------|------------------------|
| Field Team:  |   | Bill Scheer                                |   |                          |              |              |                      | Date:              | 5-30-18                |
| Weather/Ter  | np:   | Gon t                                      | +WAR                                      | m                        |              |              | Arrival T            | ime to Well:       | 13:30                  |
| Purge Metho  |   |  |   |                          |              |              | Initial DT           | W (ft btc):        | (3.57)                 |
| Pump Settin  | g <sup>5</sup> :                            |  |   | Notes:                   |              |              |                      |                    |                        |
|  |   | s real                                     |   | Field                    | d Parameters | 5            |                      |                    |                        |
| Time <sup>1</sup>  | DTW <sup>2</sup>                            | Purge Vol.<br>(ml)                         | pН  | Sp. Cond.<br>(uS/cm)     | DO<br>(mg/L) | Temp<br>(°C) | ORP<br>(mV)          | Turbidity<br>(NTU) | Note color, odor, etc. |
|  | Begin Pumpir                                |  | 22.24                                     |                          |              |              |                      |                    |                        |
|  | $\overline{}$                               |  |   |                          |              |              |                      |                    |                        |
|  |   |  |   |                          |              |              | 2                    |                    |                        |
|  |   |  |   |                          |              |              |                      |                    |                        |
|  |   |  |   |                          |              |              |                      |                    |                        |
|  |   |  |   |                          |              |              |                      |                    |                        |
|  |   |  |   | $\searrow$               |              |              |                      |                    |                        |
|  |   |  |   |                          | <u></u>      |              |                      |                    |                        |
|  |   |  |   |                          |              |              |                      |                    |                        |
|  |   |  |   |                          |              |              |                      |                    |                        |
|  |   |  |   |                          |              |              |                      |                    |                        |
|  |   |  |   |                          |              |              |                      |                    |                        |
|  |   |  |   |                          |              |              | $\overline{}$        |                    |                        |
|  |   |  |   |                          |              |              |                      |                    |                        |
|  |   |  |   |                          |              |              |                      |                    |                        |
|  |   |  |   |                          |              |              |                      |                    |                        |
|  |   |  |   |                          |              |              |                      |                    |                        |
| Stabilization<br>Criteria <sup>3</sup>                             |   | •  | ± 0.1 units                               | ± 3%                     | ± 0.3 mg/L   |              | ± 10 mV              | ± 10% <sup>4</sup> | a Barta Maria          |
| <sup>1</sup> Collect field para<br><sup>3</sup> Stabilization achi | meters in consistent<br>eved after 3 succes | 3-5 minute intervals sive readings for Low | s for Low-Flow meth<br>w-Flow method; mir | nod<br>nimum parameter s |              |              | ceed 0.33 ft for Low | -Flow method       |                        |
| <sup>4</sup> For turbidity read                                    |   | <sup>5</sup> Low-flow target p             |   |                          |              |              |                      |                    |                        |
| Sample ID:   |   |  |   |                          |              |              | - 5                  | Sample Time:       |                        |
| 200 000 0 <b>0</b> 000 000   |   | (boron, calcium,                           |   | and a second second      | and TDS)     |              |                      |                    |                        |
|  |   | (total metals, Ra                          |   |                          |              |              |                      |                    |                        |
| QC SAMPLE  |   | eld Duplicate                              |   |                          | EQ Rinsate E | Blank        | TOTAL PI             | JRGED (ml):        |                        |
| QC Sample I  |   |  |   |                          |              |              |                      |                    | -                      |
| Comments:  |   |  |   |                          |              |              |                      |                    |                        |
| Johnnonto.   | ·   |  |   |                          |              |              |                      |                    |                        |

| SITE:                 | TCM LPL              | .F                   | Proje       | ect Number:                             | LCL                 |              | -                                | Well ID:           | LPLF5   |
|-----------------------|----------------------|----------------------|-------------|---|---------------------|--------------|----------------------------------|--------------------|---|
| Field Team:           |                      | Bill Scheer          |             |   |                     |              |                                  |                    | 5-30-18   |
| Weather/Ter           | np:                  | Suna V               | VARM        |   |                     |              | Arrival 7                        | ime to Well:       |   |
|                       |                      |                      |             |   |                     |              | -                                |                    |   |
| Pump Settin           | g⁵:0                 | onla                 | (~          | Notes:                                  |                     |              |                                  |                    |   |
|                       |                      | 1                    |             |   | d Parameters        | )            |                                  |                    |   |
| Time <sup>1</sup>     | DTW <sup>2</sup>     | Purge Vol.<br>(ml)   | рН          | Sp. Cond.<br>(uS/cm)                    | DO<br>(mg/L)        | Temp<br>(°C) | ORP<br>(mV)                      | Turbidity<br>(NTU) | Note color, odor, etc.  |
| 5                     | Begin Pumpin         | g                    |             |   |                     |              |                                  |                    |   |
| 4                     |                      |                      | 6.63        | 2016                                    | 3.66                | 13.8         | 5                                | 5.7                |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |
|                       |                      | I                    |             |   |                     |              |                                  |                    |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |
| Stabilization         |                      |                      |             |   |                     |              |                                  |                    |   |
| Criteria <sup>3</sup> | meters in consistent | •                    | ± 0.1 units | ± 3%                                    | ± 0.3 mg/L          | -            | ± 10 mV<br>xceed 0.33 ft for Lov | ± 10% <sup>4</sup> |   |
|                       | eved after 3 succes  | sive readings for Lo |             | nimum parameter s                       | ubset: pH, sp. cond |              |                                  |                    |   |
| Sample ID:            | 0530                 | 18-CCR.              | - LPLF5     | 92 - Million Colleges (Heles) - Mile He | togenen ox          |              | _ :                              | Sample Time:       | 14:20   |
|                       | Appendix III         |                      |             |   | and TDS)            |              |                                  |                    | in and the second se |
|                       | Appendix IV          | 10 × 10              |             |   |                     |              |                                  |                    |   |
| QC SAMPLE             |                      | eld Duplicate        |             |   | EQ Rinsate B        | lank         | TOTAL P                          | URGED (ml):        |   |
| QC Sample I           | D:                   |                      |             |   |                     |              |                                  |                    |   |
| Comments:             |                      | Not                  |             |   |                     |              |                                  |                    |   |
|                       |                      |                      |             |   |                     |              |                                  |                    |   |

| SITE:                                  | TCM LPL                                      | _F                   | Proj              | ject Number:          | CAR                  | 2            | ,                    | Well ID:           | LPLF 7R                |
|--|--|----------------------|-------------------|-----------------------|----------------------|--------------|----------------------|--------------------|------------------------|
| Field Team:                            |  | Bill Scheer          |                   |                       |                      |              |                      | Date:              | 5-30-1B                |
| Weather/Te                             | mp:  | Sur a                | BRIZ              | zi                    |                      |              | Arrival 1            | ime to Well:       | 12:20                  |
| Purge Metho                            | od: 🕅 Blad                                   | der 🛛                | Peristaltic       | 🗌 Grab                |                      |              |                      |                    | (19.71)                |
| Pump Settin                            | ig⁵: <u>150</u>                              | allnin               |                   | Notes:                |                      |              |                      |                    |                        |
|  |  |                      |                   | Field                 | d Parameters         |              |                      |                    |                        |
| Time <sup>1</sup>                      | DTW <sup>2</sup>                             | Purge Vol.<br>(ml)   | рН                | Sp. Cond.<br>(uS/cm)  | DO<br>(mg/L)         | Temp<br>(°C) | ORP<br>(mV)          | Turbidity<br>(NTU) | Note color, odor, etc. |
| 5                                      | Begin Pumpin                                 | g                    |                   |                       |                      |              |                      |                    |                        |
| 10                                     | (20.03)                                      | 1500                 | 6.05              | 2873                  | .82                  | 14.7         | 1368 8               | 1.3                |                        |
| 15                                     | (20.10)                                      | 2250                 | 6.04              | 238                   | .00                  | 14.6         | 1368                 | 1.2                |                        |
| 20                                     | (20.09                                       | 3000                 | 6.04              | 2883                  | 03                   | 14.6         | 136.7                | 112                |                        |
|  |  |                      |                   |                       |                      | 1            |                      |                    |                        |
|  |  |                      |                   |                       |                      |              |                      |                    |                        |
|  |  |                      |                   |                       |                      |              |                      |                    |                        |
|  |  |                      |                   |                       |                      |              |                      |                    |                        |
|  |  |                      |                   |                       |                      |              |                      |                    |                        |
|  |  |                      |                   |                       |                      |              |                      |                    |                        |
|  |  |                      |                   |                       |                      |              |                      |                    |                        |
|  |  |                      |                   |                       |                      |              |                      |                    |                        |
|  |  |                      |                   |                       |                      |              |                      |                    |                        |
|  |  |                      |                   |                       |                      |              |                      |                    |                        |
|  |  |                      |                   |                       |                      |              |                      |                    |                        |
|  |  |                      |                   |                       |                      |              |                      |                    |                        |
| Stabilization<br>Criteria <sup>3</sup> |  |                      | ± 0.1 units       | ± 3%                  | ± 0.3 mg/L           | •            | ± 10 mV              | ± 10% <sup>4</sup> | •                      |
| <sup>3</sup> Stabilization achi        | meters in consistent<br>eved after 3 success | sive readings for Lo | w-Flow method; mi | nimum parameter s     | ubset: pH, sp. cond. |              | ceed 0.33 ft for Low | -Flow method       | ·                      |
| <sup>4</sup> For turbidity read        |  |                      |                   | .5 L/min (0.03 - 0.13 | ) gal/min)           |              |                      |                    | 12:110                 |
| Sample ID:                             |  |                      | CR-LP             |                       | 1700                 |              | . 8                  | ample Time:        | 12:40                  |
| Analysis:                              | Appendix III (                               |                      |                   |                       | and TDS)             |              |                      |                    |                        |
| [                                      | Other, specify                               |                      |                   | <i>/</i> ·            |                      |              |                      |                    |                        |
| QC SAMPLE                              | : <b>1</b> Fie                               | eld Duplicate        | □ MS/I            | MSD 🗆                 | EQ Rinsate B         | lank         | TOTAL PL             | JRGED (ml):        | 3000                   |
| QC Sample I                            | D: _05                                       | 3018-6               | d the             | STAR                  | FD                   |              |                      |                    | 12:40                  |
| Comments:                              |  | WVVV                 | 8 - 19            |                       |                      |              |                      |                    |                        |

| SITE:                                  | TCM LPL                                      | .F                             | Proj                   | ect Number:          | CCR          |                     | ė                         | Well ID:           | LPLF 8                 |
|--|--|--------------------------------|------------------------|----------------------|--------------|---------------------|---------------------------|--------------------|------------------------|
| Field Team:                            |  | Bill Scheer                    |                        |                      |              |                     |                           |                    | 5-30-18                |
| Weather/Ter                            | mp:  | LIDUTO                         | st h                   | ARM                  |              |                     | Arrival                   | Fime to Well:      | 12:50                  |
| Purge Metho                            | od: 🔲 Blad                                   | der 🖾 I                        | Peristaltic            | Grab                 | □ Other:     |                     | Initial DT                | W (ft btc):        | (11,18)                |
| Pump Settin                            | g⁵: <u>loe</u>                               | mlm                            | N                      | Notes:               |              |                     |                           |                    |                        |
|  |  |                                | 1-2-2-31               | Field                | d Parameter  | 5                   |                           |                    |                        |
| Time <sup>1</sup>                      | DTW <sup>2</sup>                             | Purge Vol.<br>(ml)             | рН                     | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L) | Temp<br>(°C)        | ORP<br>(mV)               | Turbidity<br>(NTU) | Note color, odor, etc. |
| 5                                      | Begin Pumpin                                 | g                              |                        |                      |              |                     |                           |                    |                        |
| 10                                     | (11.31)                                      | 1000                           | 5.72                   | 3773                 | 1.53         | 15.0                |                           | 1.9                |                        |
| 15                                     | (11.48)                                      | 1500                           | 5.72                   | 3785                 | 1,10         | 15.0                |                           | 1.6                |                        |
| 20                                     | (11.53)                                      | 2000                           | 5.72                   |                      |              | 15.1                |                           | 1,5                |                        |
|  |  |                                |                        |                      |              |                     |                           |                    |                        |
|  |  |                                |                        |                      |              |                     |                           |                    |                        |
|  |  |                                |                        |                      |              |                     |                           |                    |                        |
|  |  |                                |                        |                      |              |                     |                           |                    |                        |
|  |  |                                |                        |                      |              |                     |                           |                    |                        |
|  |  |                                |                        |                      |              |                     |                           |                    |                        |
|  |  |                                |                        |                      |              |                     |                           |                    |                        |
|  |  |                                |                        |                      |              |                     |                           |                    |                        |
|  |  |                                |                        |                      |              |                     |                           |                    |                        |
|  |  |                                |                        |                      |              |                     |                           |                    |                        |
|  |  |                                |                        |                      |              |                     |                           |                    |                        |
| Stabilization<br>Criteria <sup>3</sup> |  | •                              | ± 0.1 units            | ± 3%                 | ± 0.3 mg/L   |                     | ± 10 mV                   | ± 10% <sup>4</sup> | •                      |
| <sup>1</sup> Collect field para        | meters in consistent<br>eved after 3 success |                                |                        |                      |              |                     | ceed 0.33 ft for Lov<br>O | v-Flow method      |                        |
| <sup>4</sup> For turbidity read        | ings > 10 NTUs                               | <sup>5</sup> Low-flow target p | ourge rate is 0.1 - 0. | 5 L/min (0.03 - 0.13 |              |                     |                           |                    | 12:10                  |
|  | 063  |                                |                        | _                    |              |                     |                           | Sample Time:       | 13:10                  |
|  | Appendix III (                               |                                |                        |                      | and TDS)     |                     |                           |                    |                        |
| [                                      | Other, specify                               | 5 100                          |                        |                      |              |                     |                           |                    |                        |
| QC SAMPLE                              | : 🗆 Fie                                      | eld Duplicate                  |                        | ∕ISD □               | EQ Rinsate B | lank                | TOTAL PL                  | JRGED (ml):        | 2000                   |
| QC Sample I                            | D;   |                                |                        |                      |              |                     | QC                        | Sample Time:       |                        |
| Comments:                              | -  |                                |                        |                      |              |                     |                           |                    |                        |
|  | *  |                                |                        |                      |              | $\langle I \rangle$ |                           |                    |                        |

ADDRESS 1317 South 13th Ave., Kelso, WA 98626 PHONE 1 360 577 7222 FAX 1 360 636 1068

Work Order No.: 80819

| Client Name:     TransAlta Centralia Mining Company<br>Address:     913 Big Hanaford Road       Address:     913 Big Hanaford Road       City, State ZIP:     Centralia, WA 98531       Email:     bill scheer@transalta.com       Project Name:     LPLF CCR       Project Number:     4700075456 Line90       P.O. Number:     Bill Scheer       Sampler's Name:     Bill Scheer       Temperature (C):     Temp Blank Pr | alia Mining Corr<br>d Road<br>8531 | VUBUL               |             |   |            |          | I       |          |                  | Bill Scheer   |                            |           |                              |
|---|------------------------------------|---------------------|-------------|---|------------|----------|---------|----------|------------------|---|----------------------------|-----------|------------------------------|
|   | d Road                             | 1                   |             |   |            |          |         | Com      | Company:         | TransAlta C   | TransAlta Centralia Mining |           |                              |
|   | 3531                               |                     |             |   |            |          |         | Address: | 'ess:            | 913 Big Ha  | 913 Big Hanaford Road      |           |                              |
|   |                                    |                     |             |   |            |          |         | City,    | City, State ZIP: | Centralia, WA 98531   | VA 98531                   |           |                              |
| LPLF C<br>47000<br>Bill Sch   | Isalta.com                         | -                   | Phone:      | 360-330-2332                              | 0-233.     | ~        |         | Email:   | ii.              | bill scheer@  | scheer@transalta.com       | #od       |                              |
| 8ill Sch  |                                    |                     |             |   |            |          |         |          | REQUEST          | <b>REQUESTED ANALYSIS</b>   |                            |           | TAT                          |
| 8ill Sch  |                                    |                     |             |   |            | -        |         |          |                  |   |                            |           | Routine 21dav                |
| Bill Sch  | ine90                              |                     |             |   |            |          |         |          |                  |   |                            |           | -                            |
|   |                                    |                     |             |   |            |          |         |          |                  |   |                            |           | -14                          |
| Temperature ('C):   | RECEIPT                            |                     |             |   |            |          |         |          |                  |   |                            |           | 3 Dav                        |
|   | Temp Bla                           | Temp Blank Present  |             | ÷   |            |          |         |          |                  |   |                            |           | 5 Day 50%                    |
| Received Intact: Yes  | NO N/A                             | Wet Ice / Blue Ice  | le lce      |   |            |          |         |          |                  |   |                            |           | DODAC                        |
| Cooler Custody Seals: Yes   | No N/A                             | Total Containers:   | ners:       |   |            |          |         |          |                  |   |                            |           | Please call for              |
| Sample Custody Seals: Yes   | No N/A                             |                     |             | ราวเ                                      |            |          |         |          | -                |   |                            |           | availability                 |
| Sample Identification Matrix  | ix Date<br>Sampled                 | Time<br>Sampled     | Lab ID      | istno <b>2</b> to .                       | - <u>-</u> | oride    | oride   |          |                  |   |                            |           | Due Date:                    |
| 1   |                                    |                     |             | ON  | -          | -        |         | Hđ       | ilu2<br>201      |   |                            |           | Comments                     |
|   | 05/30/2018                         | 12:15               |             | m   | X          | X X      | X       | ×        | ××               |   |                            |           |                              |
|   | 05/30/2018                         | 13:40               |             | 6   | ×          | XX       | ×       | ×        | X X              |   |                            |           | US/WSD                       |
| 053018 - CCR - LPLF5 GW   | 05/30/2018                         | 14:20               |             | 2   | ×          | X X      | ×       | ×        | X X              |   |                            |           |                              |
| 053018 - CCR - LPLF7R GW  | 05/30/2018                         | 12:40               |             | 3   | ×          | X X      | ×       | ×        | ××               |   |                            |           |                              |
| 053018 - CCR - LPLF8 GW   | 05/30/2018                         | 13:10               |             | m   | ×          | ×        | ×       | ×        | ××               |   |                            |           |                              |
| FD GW   |                                    |                     |             | 3   | ×          | ×<br>×   | ×       | ×        | ××               |   |                            |           |                              |
|   |                                    |                     |             |   |            | +        |         |          |                  |   |                            |           |                              |
|   |                                    |                     |             |   |            | +        |         |          |                  |   |                            |           |                              |
|   |                                    |                     |             |   |            | $\vdash$ |         |          |                  |   |                            |           |                              |
|   |                                    |                     |             |   |            |          |         |          |                  |   |                            |           |                              |
| Dissolved   | Ag, Al, As, B, Ba, Be, Ca,         | 8a, Be, Ca, Cd, Co  | Ľ,          | Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, | Li, Mg,    | Mn, N    | 10, Na, | Ni, P,   | Sb, Se,          | Si, Sn, Sr, Tl, V, Zn,  | Zn, Zr                     | Addition  | Additional Methods Available |
| Total   | Ag, Al, As, B, Ba, Be, Ça,         | sa, Be, Ça, Cd, Co, | Co, Cr, Cu, | л, Fe, K,                                 | Li, Mg,    | Mn, N    | lo, Na, | Ni, P,   | Pb, Sb, Se,      | Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr | Zn, Zr                     | 2         | Upon Request                 |
| æ   | RELINQUISHED                       | HED BY              |             |   |            |          |         |          |                  |   | RECEIVED BY                | Y         |                              |
| Print Name  | All I                              | Siggature           |             | Da  | Date/Time  | Je       |         |          | Print Name       | me  | Sign                       | Signature | Date/Time                    |
| William Scheer  | I MANN I                           |                     | 1           | 05/31/2018                                | 2018       |          |         |          |                  |   |                            |           |                              |

Chain of Custody

|  |  | _                                     |                        |                      |  | 5                  |                          |                    | 10 - 10                |
|--|--|---------------------------------------|------------------------|----------------------|--|--------------------|--------------------------|--------------------|------------------------|
| SITE:  | TCM LPL                                      | .F                                    | Proj                   | ect Number:          | CCT  |                    |                          |                    | LPLF2R                 |
| Field Team:  |  | Bill Scheer                           |                        |                      |  |                    |                          | Date:              | 8-9-18                 |
| Weather/Ter  | mp:  | No 2                                  | i WARD                 | r                    |  |                    | Arrival 7                | ime to Well:       | 8:25                   |
| Purge Metho  | od: 🗌 Blad                                   | der 📈                                 | Peristaltic            | 🗌 Grab               | Other:   |                    | Initial DT               | W (ft btc):        | (4.75)                 |
| Pump Settin  | g⁵: <u>Z</u> €                               | maller                                | N                      | Notes:               |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      | d Parameters   | S                  |                          |                    |                        |
| Time <sup>1</sup>  | DTW <sup>2</sup>                             | Purge Vol.<br>(ml)                    | pН                     | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L)   | Temp<br>(°C)       | ORP<br>(mV)              | Turbidity<br>(NTU) | Note color, odor, etc. |
| 6  | Begin Pumpin                                 | ·····                                 |                        | (2000)               | (  |                    |                          | (                  |                        |
| 10   | (4.81)                                       | 2000                                  | 5.83                   | 3861                 | .95  | 15.5               |                          |                    |                        |
| (  | (4.93)                                       | 3000                                  | 5.81                   | 3857                 | .90  | 15.3               |                          |                    |                        |
| -15-   | (4.95)                                       |                                       | 5.8                    | T.                   |  |                    |                          |                    |                        |
| 20   | (9.75)                                       | 4000                                  | 2.8                    | 3855                 | .87  | 15]                |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |
| Stabilization<br>Criteria <sup>3</sup>   |  |                                       | ± 0.1 units            | ± 3%                 | ± 0.3 mg/L   | •                  | ± 10 mV                  | ± 10% <sup>4</sup> |                        |
| and the second s | meters in consistent<br>eved after 3 success |                                       |                        |                      | and the second sec | down should not ex | al en concentra con cons | -Flow method       |                        |
| <sup>4</sup> For turbidity read  | ings > 10 NTUs                               | <sup>5</sup> Low-flow target p        | ourge rate is 0.1 - 0. | 5 L/min (0.03 - 0.1  |  |                    |                          |                    | Mille                  |
| Sample ID:   | 08091  | e-ca-                                 | LPLFZ                  | 2                    |  |                    |                          | Sample Time:       | 8:45                   |
|  | Appendix III (                               |                                       |                        |                      | and TDS)   |                    |                          |                    |                        |
| i l  | Appendix IV     Other_specif                 | • • • • • • • • • • • • • • • • • • • | adium 226, and         | 1100                 |  |                    |                          |                    |                        |
| QC SAMPLE  |  | eld Duplicate                         |                        |                      | EQ Rinsate E   | Blank              | τοται ρι                 | JRGED (ml):        | 2000                   |
| QC Sample I  |  | sia papiloato                         |                        |                      |  |                    |                          | Sample Time:       |                        |
| Comments:  |  |                                       |                        |                      |  |                    |                          | - surpre vinter    |                        |
| ooninienta.  | 3  |                                       |                        |                      |  |                    |                          |                    |                        |
|  |  |                                       |                        |                      |  |                    |                          |                    |                        |

| SITE:                 | TCM LP             | LF  | Proj           | ect Number:          | 2            | Well ID: LPLF8 |             |                    |                        |  |
|-----------------------|--------------------|---|----------------|----------------------|--------------|----------------|-------------|--------------------|------------------------|--|
| Field Team:           |                    | Bill Scheer   |                |                      |              |                |             | Date:              | 8-9-18                 |  |
| Weather/Ter           | mp: 🗸              | Suc \$  | Effor          |                      |              |                | Arrival 1   | Time to Well:      | 9:00                   |  |
| Purge Metho           | od: 🗆 Bla          | dder 🛱  | Peristaltic    |                      | □ Other:     |                | Initial DT  | W (ft btc):        | (12.12)                |  |
| Pump Settin           | g <sup>5</sup> :?  | onlymin   |                | Notes:               |              |                |             |                    |                        |  |
|                       |                    |   |                |                      | d Parameters |                |             |                    |                        |  |
| Time <sup>1</sup>     | DTW <sup>2</sup>   | Purge Vol.<br>(ml)  | рН             | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L) | Temp<br>(°C)   | ORP<br>(mV) | Turbidity<br>(NTU) | Note color, odor, etc. |  |
| 5                     | Begin Pump         | ing   |                |                      |              |                |             |                    |                        |  |
| 10                    | (12.19)            | 1200  | 6.01           | 3551                 | 1.1          | 14.49          |             |                    |                        |  |
| 15                    | (12.21)            | 1800  | 5.99           | 3556                 | .91          | 14.60          |             |                    |                        |  |
| 20                    | (12.26)            | 2400  | 5.98           | 3557                 | ,82          | 147            |             |                    |                        |  |
|                       |                    |   | 1.000          |                      |              |                |             |                    | 2                      |  |
|                       |                    |   |                |                      |              |                |             |                    |                        |  |
|                       |                    |   |                |                      |              |                |             |                    |                        |  |
|                       |                    |   |                |                      |              |                |             |                    |                        |  |
|                       |                    |   |                |                      |              |                |             |                    |                        |  |
|                       |                    |   |                |                      |              |                |             |                    |                        |  |
|                       |                    |   |                |                      |              |                |             |                    |                        |  |
|                       |                    |   |                |                      |              |                |             |                    |                        |  |
|                       |                    |   |                |                      |              |                |             |                    |                        |  |
|                       |                    |   |                |                      |              |                |             |                    |                        |  |
|                       |                    |   |                |                      |              |                |             |                    |                        |  |
| Stabilization         |                    |   | ± 0.1 units    | ± 3%                 | ± 0.3 mg/L   |                | ± 10 mV     | ± 10% <sup>4</sup> |                        |  |
| Criteria <sup>3</sup> |                    |   |                |                      |              |                |             |                    |                        |  |
|                       | eved after 3 succe | nt 3-5 minute interval<br>ssive readings for Lo<br><sup>5</sup> Low flow target |                | nimum parameter s    |              |                |             | V-Flow method      |                        |  |
| Sample ID:            |                    | 180918-   |                |                      | o ganning    |                | S           | Sample Time:       | 9:20                   |  |
|                       |                    | l (boron, calcium   |                |                      | and TDS)     |                |             |                    |                        |  |
| l                     | Appendix IV        | (total metals, R  | adium 226, and | Radium 228).         |              |                |             |                    |                        |  |
| QC SAMPLE             |                    | ifyield Duplicate   |                |                      | EQ Rinsate B | lank           | τοται ρι    | JRGED (ml).        | 2400                   |  |
| QC Sample I           |                    | iona Duplicate  |                |                      |              |                |             | Sample Time:       |                        |  |
| Comments:             | 2014/07            |   |                |                      |              |                | , Stor      |                    |                        |  |
|                       |                    |   |                |                      |              |                |             |                    | F1                     |  |

| Address:<br>Lity, State ZIP:                                 | TransAlta    |             |                                  |                 |            |                   |       |       |         |          |          | Bill  | to:     | 2.1.4  | 1. 115  | Bill   | Schee               | r      |                |        |         |          |       |                                |
|--|--------------|-------------|----------------------------------|-----------------|------------|-------------------|-------|-------|---------|----------|----------|-------|---------|--------|---------|--------|---------------------|--------|----------------|--------|---------|----------|-------|--------------------------------|
| Address:<br>Lity, State ZIP:                                 |              | Centralia   | a Mining Com                     | pany            |            |                   |       |       |         |          | 1        | -     | npar    | ny:    | 11.11   |        |                     | a Cent | ralia M        | linino |         |          |       |                                |
|  | 913 Big H    |             |                                  |                 |            |                   |       |       |         |          | 1        |       | dres    |        | AC 12   |        |                     | lanafo |                |        |         |          |       |                                |
| mall:  | Centralia,   | WA 985      | 31                               |                 |            |                   |       |       |         |          | 1        | City  | , Sta   | ate Z  | IP:     |        |                     | WA 9   |                |        |         |          |       |                                |
|  | bill schee   | er@transa   | alta.com                         |                 | Phone:     | 360               | )-330 | )-23  | 32      |          | 1        | Em    |         | 111    | 19 11   |        |                     | r@tran |                | om     | 1       | po#      |       |                                |
| roject Name:   | LPLF CC      | R           |                                  |                 |            | 120               | Stall |       | 182     | (13)5    | 19103    | 1.18  | RE      | QUE    | STE     |        |                     | IS     | Contracted and | 26.36  | inesia  | Sales in | 336.1 | TAT                            |
| roject Number:   |              |             |                                  |                 |            | 1995              | 193   |       |         |          |          |       |         |        |         |        |                     |        |                |        |         | TT       | I     | Routine 21 day                 |
| O. Number:   | 4700075      | 456 Line    | 290                              |                 |            | 12                |       |       | 1       |          |          |       |         |        |         |        |                     |        | 1 1            |        |         |          | i ir  | Same Day 100                   |
| ampler's Name:   | Bill Schee   | er          |                                  |                 |            | 一位                |       |       |         |          |          |       |         | 1      |         |        |                     |        |                |        |         | 11       | l h   | Next Day ***                   |
| ·清清·东京和中国东   | SA           | MPLE R      | ECEIPT                           |                 | in all the |                   | 憲法    |       |         |          |          |       |         |        |         |        |                     |        |                |        |         |          | F     | 3 Day                          |
| emperature (C):  | 11:12:00     |             | Temp Bla                         | nk Present      |            | 125               |       |       |         |          |          |       |         |        |         |        |                     |        |                |        |         |          | F     | X 5 Day 509                    |
| eceived Intact:  | NAME OF      | Yes         | No N/A                           | Wet Ice /       | Blue Ice   |                   | 100   |       |         |          |          |       |         |        |         |        |                     |        |                |        |         |          | Y     | AN DECOMPANY AND A DEC         |
| ooler Custody Seals  | NAMES I      | Yes         | No N/A                           | Total Cont      |            |                   |       |       |         |          |          |       |         |        |         |        |                     |        |                |        |         |          | 1.10  | Surcharges.<br>Please call for |
| ample Custody Seals  |              | Yes         | No N/A                           |                 | CATELO (TR | ers               |       |       |         |          |          |       |         |        |         |        |                     |        |                |        |         |          |       | availability                   |
| Sample Identifica  | ition        | Matrix      | Date<br>Sampled                  | Time<br>Sampled | Lab ID     | No. of Containers |       | Boron | Calcium | Chloride | Fluoride | Hq    | Sulfate | TDS    |         |        |                     |        |                |        |         |          |       | Due Date:                      |
| 102418 - CCR - LP  | LF1          | GW          | 10/24/2018                       | 9:25            |            | 3                 |       | X     | X       | X        | X        | X     | X       | X      |         |        |                     | -      |                |        | -       |          |       | comments                       |
| 053018 - CCR - LPL   | F2R          | GW          | 10/24/2018                       | 11:55           |            | 3                 |       | X     | X       | X        | X        | X     | X       | X      |         |        |                     |        | +              |        | 1-      |          | A     | A\$/MSD                        |
| FD   |              | GW          |                                  |                 |            | 3                 |       | X     | X       | X        | X        | X     | X       | X      |         |        | -                   |        |                |        |         |          |       | 10/1100                        |
| 102418 - CCR - LPL   | .F7R         | GW          | 10/24/2018                       | 9.50            |            | 9                 |       | X     | X       | x        | X        | X     | X       | X      |         |        |                     |        |                |        | -       |          |       |                                |
| 053018 - CCR - LPI   | LF8          | GW          | 10/24/2018                       | 10:30           | 1          | 3                 |       | X     | X       | X        | X        | X     | X       | x      |         |        |                     | -      |                |        |         |          | -     |                                |
|  |              |             |                                  |                 |            |                   |       |       |         |          |          |       |         |        |         |        | 1                   |        | 1-1-           | +      |         |          |       |                                |
|  |              |             |                                  |                 |            |                   |       |       |         |          |          |       |         |        |         |        |                     |        |                |        | -       | +        | -     |                                |
|  |              |             |                                  |                 |            |                   | -     | 1     |         |          |          |       |         |        |         |        |                     | -      |                |        | -       |          | -     |                                |
|  |              |             |                                  |                 |            |                   |       |       |         |          |          |       |         |        |         |        |                     |        |                | -      | -       |          |       |                                |
|  |              |             |                                  |                 |            |                   |       |       |         |          |          |       |         |        |         |        |                     | -      |                | -      | -       |          | +     |                                |
|  |              |             |                                  |                 |            |                   |       |       |         | -        |          |       |         |        |         |        |                     |        |                |        | 1       |          | -     |                                |
| ssolved<br>tal   |              |             | g, Al, As, B, Ba<br>n Al As B Ba |                 |            |                   |       |       |         |          |          |       |         |        |         |        |                     |        |                |        | Ad      |          |       | ethods Available<br>Request    |
| otal Ag, Al, As, B, Ba, Be, Ca, Cd, Co, C<br>RELINQUISHED BY |              |             |                                  |                 | Les ales   | -u, IC            | 1.11  | 1, my | 1. 1411 | , mo,    | ind,     | 1.5.5 |         | 30, 3  | ic, 31, | (3)(3) | NASSA               |        |                | DRV    | 1.1.1.1 |          | spon  | wednest                        |
| Print Name Signature   |              |             |                                  |                 | 187745     | 12.55             | Date  | e/Th  | me      | 1964     |          |       | P       | rint P | Nami    | P      | 12.1                | T      | 10.0000000     |        |         | 1. 1. N. |       | Date/Time                      |
| William Sc   | an ala cita. | 41/410/21 E | 11 Ali                           | and the second  | 10,000,000 | 10/2              | 25/2  | 2.200 |         | 135      | 1        | 1     |         | 1      | 020352  | re     | Signature Date/Time |        |                |        |         |          |       |                                |

ADDRESS 1317 South 13th Ave., Kelso, WA 98626 PHONE 1 360 577 7222 FAX 1 360 636 1068

#### Work Order No.: 80819

KI810468 Chain of Custody

|                    | -                         |                   |                         |                 |            |              |         |          |             |               |                     |               |          |          | 10       |       |
|--------------------|---------------------------|-------------------|-------------------------|-----------------|------------|--------------|---------|----------|-------------|---------------|---------------------|---------------|----------|----------|----------|-------|
|                    |                           |                   |                         | Coole           | r Ro       | coint        | and t   |          | vation      | Б.            |                     |               |          | PC       | 4C       | _     |
| Client             | Trav                      | isz (f            | - 2                     | COUL            | 1 1.0      | ceipi        | anu r   |          |             |               |                     | ,110          |          |          |          |       |
|                    | 10/25/1                   |                   |                         | · alac          | 1.0        |              |         | Serv     | ice Req     |               |                     | 468           |          |          |          | _     |
|                    |                           |                   | Opened:_                | 10/25           | <u>[[8</u> |              | By:_(   | -67      | (           | Inloa         | ded:_(0)            | 125/18        | By       | CE       | 3        | _     |
|                    | es were rec               |                   | USPS                    | Fed E.          | r          | UPS          | D       | HL       | PDX         | Cou           | urier H             | and Deliver   | ed       |          |          |       |
|                    | es were rec               |                   |                         | Cooler          | > B        | ox           | Enve    | elope    | Oth         | er            |                     |               |          | NA       | r        |       |
|                    | custody sea               |                   |                         | NA C            | S          | N            | It      | f yes, h | ow many     | and           | where?              | 1 From        | +        |          |          |       |
| If pres            | ent, were cu              | ustody seals      | intact?                 |                 | P          | N            |         | If pre   | sent, we    | e the         | y signed an         | d dated?      |          | ¥        | 2        | N     |
| Raw<br>Cooler Temp | Corrected.<br>Cooler Temp | Raw<br>Temp Blank | Corrected<br>Temp Blank | Corr.<br>Factor |            | hermon<br>ID | eter    | Cool     | er/COC II   | NA            | 1                   | Tracking      | Numb     | er       |          |       |
| -0.9               | -1.0                      | 5.2               | 5.1                     | -0,1            | 13         | 39           | 5       |          | (           | NA            |                     |               |          |          | NAD      | Filed |
|                    |                           |                   |                         |                 |            |              |         |          |             |               |                     |               |          |          |          |       |
|                    |                           |                   |                         |                 |            |              |         |          | ~           |               |                     |               |          |          |          |       |
|                    |                           |                   |                         |                 | +          |              |         | -        |             |               |                     |               |          |          |          |       |
| 4. Packin          | g material:               | Inserts (         | Baggies                 | Bubble          | Vran       | Gel P        | acks    | Watt     | ca D-       | Inc           | Classie -           |               |          | -        |          |       |
| 5. Were            | custody pap               | ers properly      | filled out              | (ink, sign      | ed, etc    | :)?          |         | , rrei I | ce Dry      | 100           | SICEVES             | -             |          |          | <u> </u> |       |
|                    | samples rec               |                   |                         |                 |            |              | on ) ?  | Tradiana |             | ., .          |                     |               | NA       | <u> </u> | Ś        | N     |
|                    |                           | it ap             | plicable, tis           | ssue samp       | es we      | Te rece      | ived    | Fro:     |             |               | below.<br>ly Thawed | Thomas        | NA       | Y CP     | 9        | N     |
| . Were a           | ll sample la              | bels comple       | ete (i.e ana            | lysis, pres     | ervatio    | on, etc.     | )?      |          |             |               | 5                   | Thawed        | NA       | Q        | 5        | N     |
| 3. Did all         | sample lab                | els and tags      | agree with              | custody j       | apers      | ? India      | cate m  | ajor dis | crepanc     | es in         | the table o         | n noau 7      |          | 22       | 5        |       |
| . Were a           | appropriate               | bottles/cont      | tainers and             | volumes         | eceiv      | ed for t     | he test | s indic: | ated?       |               |                     | r page 2.     | NA<br>NA | 5        | ( · · ·  | N     |
| 0. Were            | the pH-pres               | served bottle     | es (see SMC             | GEN SOF         | ) rece     | eived at     | the ap  | propria  | te pH?      | ndico         | tte in the to       | ble below     |          | 0        | ·        | N     |
| 1. Were            | VOA vials                 | received wi       | ithout head             | space? In       | dicate     | e in the     | table l | below.   |             |               | de in me tu         | one below     | NA       |          | 10.00    |       |
|                    | C12/Res neg               |                   |                         | .e              |            |              |         |          |             |               |                     |               | NA       | Y Y      |          | N     |
| 8                  |                           |                   |                         |                 |            |              |         |          | r           |               |                     |               | (NA      | V Y      |          | N     |
|                    | Sample ID c               |                   |                         |                 |            | ple ID o     |         |          |             |               |                     | Identified by | /:       |          |          |       |
|                    | CCR-L                     |                   | 14                      | 0530            |            |              |         |          | R           | E             | Elimin              | ation         |          |          |          | -     |
| 10241              | 8-CCR -                   | LPLFS             | 3                       | 0530            | 18-        | CCR          | -4      | PLF      | 8           | E             | limina              | et;on         |          |          |          | _     |
|                    |                           |                   |                         |                 |            |              | -       |          |             |               |                     |               |          |          |          |       |
|                    | Sample ID                 |                   |                         |                 |            | Head-        |         |          |             |               | Volume              | Reagent I     | ot       |          | T        |       |
| 102418             | -CCR-0                    | PLETR             | 1-250                   |                 | Temp       | space        | Broke   | PH       | Reag        |               | added               | Numbe         | r        | Initials | Time     |       |
|                    |                           |                   |                         | 241             |            |              |         | $\frown$ | <u> HNO</u> | 3             | 0.5 ml              | RE1-4         | 8-4      | CG       | 1420     | 2     |
|                    |                           |                   |                         |                 | -          |              |         |          |             |               |                     |               |          |          |          | _     |
|                    |                           |                   | +                       |                 |            |              |         |          |             |               |                     |               |          |          |          |       |
|                    |                           |                   |                         |                 |            |              |         |          |             |               |                     |               |          |          |          |       |
| 107                |                           | 11 Wites          |                         |                 |            |              |         |          |             |               |                     |               | - 1      |          |          | _     |
| Valar              |                           | s, & Resa         |                         |                 |            |              | L       | <u> </u> |             |               | ,                   |               |          |          |          |       |
| Notes, Di          | are mandre                | s, & Kesa         | attens:                 |                 | H          | Sece         | ine     | d        | SX          | Up l          | lune                | forl          | PL       | F7.      | K        |       |
|                    | S C                       |                   |                         |                 | $\alpha$   | <u>PC</u>    | com     | ment     | 524         | 5             | MS/M                | ISD on        | _ LF     | 2F2      | 2R       |       |
| S                  | HOR'                      | T HO              | LDT                     | ME              |            |              |         |          |             |               | ,                   |               |          |          |          |       |
|                    | and the second second     |                   |                         |                 |            |              |         |          |             |               |                     |               |          |          |          |       |
| 7/25/16            |                           |                   |                         |                 |            |              |         |          |             | in the second | ····                |               |          |          |          |       |

Manual Address (Automation States)

| SITE:   | TCM L            | .PLF                     | Pro                   | ject Number:         | 2                    | Well ID: LPLF1                              |             |                    |                        |  |
|---|------------------|--------------------------|-----------------------|----------------------|----------------------|---|-------------|--------------------|------------------------|--|
| Field Team:                                   |                  | Bill Scheer              |                       |                      |                      |   |             | Date:              | 10/24/18               |  |
| Weather/Te                                    | mp:              | Gum                      | \$ C                  | 001                  |                      |   | Arrival     | Time to Well:      | 9:15                   |  |
| Purge Metho                                   | od: 🗆 E          | Bladder 🗌                | Peristaltic           | 🗌 Grab               | XOther:              | PAILER                                      | Initial DT  | W (ft btc):        | 9!(5<br>58.08          |  |
| Pump Settin                                   | -                |                          |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          |                       | Fiel                 | d Parameter          | s   |             |                    |                        |  |
| Time <sup>1</sup>                             | DTW <sup>2</sup> | Purge Vol.<br>(ml)       | рН                    | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L)         | Temp<br>(°C)                                | ORP<br>(mV) | Turbidity<br>(NTU) | Note color, odor, etc. |  |
|   | Begin Pu         | mping                    |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          | 6.65                  | 3300                 | 1.5                  | 13.0  |             | 128.7              |                        |  |
|   |                  |                          |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          |                       |                      | <i>k</i> t           |   |             |                    | E:                     |  |
|   |                  |                          |                       | 2                    |                      |   |             |                    |                        |  |
|   |                  |                          |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          |                       | _                    |                      |   |             |                    |                        |  |
|   |                  |                          |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          |                       |                      |                      |   |             |                    |                        |  |
| Stabilization                                 |                  |                          |                       |                      |                      |   |             |                    |                        |  |
| Criteria <sup>3</sup>                         | •                | •                        | ± 0.1 units           | ± 3%                 | ± 0.3 mg/L           |   | ± 10 mV     | ± 10% <sup>4</sup> |                        |  |
| <sup>3</sup> Stabilization achieved           | eved after 3 su  | stent 3-5 minute interva | ow-Flow method; m     | inimum parameter s   | subset: pH, sp. cond | down should not ex<br>., and turbidity or D |             | v-Flow method      |                        |  |
| <sup>4</sup> For turbidity read<br>Sample ID: | 6                | 118 - CCR                | purge rate is 0.1 - 0 | 1                    | s gavnin)            |   | ç           | Sample Time:       | 9:25                   |  |
|   |                  | xilli(boron, calciur     |                       |                      | and TDS)             |   |             |                    |                        |  |
| -   |                  | xIIV (total metals, I    |                       |                      | and rooy             |   |             |                    |                        |  |
|   | Other, s         | pecify                   |                       |                      |                      |   |             |                    |                        |  |
| QC SAMPLE                                     | : 🗆              | Field Duplicate          | e □ MS/               | MSD 🗆                | EQ Rinsate E         | llank                                       | TOTAL PL    | JRGED (ml):        |                        |  |
| QC Sample II                                  | D:               |                          |                       |                      |                      |   | QC          | Sample Time:       |                        |  |
| Comments:                                     |                  |                          |                       |                      |                      |   |             |                    |                        |  |
|   |                  |                          |                       |                      |                      |   |             |                    |                        |  |

| SITE:                                  | TCM LP              | LF   | Pro               | ject Number          | :                    | 2            | -                         | Well ID:           | LPLF2                         |
|--|---------------------|--|-------------------|----------------------|----------------------|--------------|---------------------------|--------------------|-------------------------------|
| Field Team:                            |                     | Bill Scheer  |                   |                      |                      | ,            | _                         | Date:              | 10/24/18                      |
| Weather/Ter                            | mp:                 | Su.  | ~ \$              | 6000                 | -                    |              | Arrival                   | Time to Well:      | 11:40                         |
| Purge Metho                            | od: 🗌 Blac          | lder 🗆   | Peristaltic       | Grab                 | □ Other: _           |              | Initial D                 | W (ft btc):        | 10 [24/18<br>11:40<br>(14.91) |
| Pump Settin                            | g ⁵: _ <i>[</i> //  | ATTER L  | wel e             | DALT Notes           | :                    |              |                           |                    |                               |
|  |                     |  |                   | Fie                  | ld Parameter         | S            |                           |                    |                               |
| Time <sup>1</sup>                      | DTW <sup>2</sup>    | Purge Vol.<br>(ml)   | рН                | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L)         | Temp<br>(°C) | ORP<br>(mV)               | Turbidity<br>(NTU) | Note color, odor, etc.        |
|  | Begin Pumpi         | ng   |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     | 1  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
|  |                     |  |                   |                      |                      |              |                           |                    |                               |
| Stabilization<br>Criteria <sup>3</sup> |                     | •  | ± 0.1 units       | ± 3%                 | ± 0.3 mg/L           | ·            | ± 10 mV                   | ± 10% <sup>4</sup> |                               |
|  | wed after 3 success | 3-5 minute intervals<br>sive readings for Lo <sup>5</sup><br>Low-flow target p | w-Flow method; mi | nimum parameter :    | subset: pH, sp. cond |              | ceed 0.33 ft for Lov<br>O | v-Flow method      |                               |
| Sample ID:                             | 5                   | Low-now target p   | 9                 |                      | . ,                  |              | ç                         | Sample Time:       |                               |
|  |                     | (boron, calcium  |                   |                      |                      |              |                           |                    |                               |
| -                                      |                     | (total metals, R   |                   | (22 <b>2</b> )       |                      |              |                           |                    |                               |
| [                                      | Other, speci        | fy   |                   |                      |                      |              |                           |                    |                               |
| QC SAMPLE                              | : 🗌 Fie             | eld Duplicate  | □ MS/N            | ASD 🗆                | EQ Rinsate B         | lank         | TOTAL PL                  | JRGED (ml):        |                               |
| QC Sample IE                           | ):                  |  |                   |                      |                      |              | QC                        | Sample Time:       |                               |
| Comments:                              |                     |  |                   |                      |                      |              |                           |                    |                               |
|  | ·                   |  |                   |                      |                      |              |                           | 0                  |                               |

#### Project Number: Well ID: LPLF2R SITE: TCM LPLF Field Team: Date: 10-24-18 **Bill Scheer** 11:35 Arrival Time to Well: Weather/Temp: Purge Method: Peristaltic □ Other: \_\_\_\_\_ Initial DTW (ft btc): 5.% Bladder Grab Pump Setting <sup>5</sup>: 150 MI Notes: MAN **Field Parameters** Purge Vol. Sp. Cond. DO Temp ORP Turbidity DTW<sup>2</sup> Time<sup>1</sup> pH Note color, odor, etc. (ml) (uS/cm) (mg/L) (°C) (mV)(NTU) 5 **Begin Pumping** 13,5 3982 1.7 10 1500 6.14 693 398,6 ,12 13.5 15 32250 4 0 3985 20 135 1.5 3000 6.1 Stabilization ± 0.1 units ± 3% ± 0.3 mg/L ± 10 mV . ± 10%<sup>4</sup> Criteria<sup>3</sup> Collect field parameters in consistent 3-5 minute intervals for Low-Flow method <sup>2</sup> DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method <sup>3</sup> Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO <sup>4</sup> For turbidity readings > 10 NTUs <sup>5</sup> Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample Time: //:55 Sample ID: 102413-CCR-LPLF2R Analysis: Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS) Appendix IV (total metals, Radium 226, and Radium 228). Other, specify\_ TOTAL PURGED (ml): 3000 QC SAMPLE : Field Duplicate □ MS/MSD EQ Rinsate Blank QC Sample ID : QC Sample Time: Comments:

| SITE:  | TCM LP                                      |                                | Pro  | oject Numbe              | 5   | Well ID: LPLF 3    |                             |                    |                        |  |
|--|---|--------------------------------|--|--------------------------|---|--------------------|-----------------------------|--------------------|------------------------|--|
| Field Team   |   | Bill Scheer                    |  |                          |   | _                  |                             | Date:              | 10/24/18               |  |
| Weather/Te   | mp:   | Gumi                           | \$ Co  | <i>~</i> 9(              |   | 8                  | -<br>Arrival                | Time to Well:      | 10/24/18<br>11:40      |  |
|  | od: 🗆 Bla                                   | dder 🗆                         | Peristaltic  | Grab                     | □ Other:  |                    | -<br>Initial D <sup>-</sup> | TW (ft btc):       | (9.25)                 |  |
| Pump Settin  | -   |                                |  |                          | 8:  |                    |                             | (                  | (1.20)                 |  |
|  | .9  |                                |  |                          | ld Parameter  | 'S                 |                             |                    |                        |  |
| Time <sup>1</sup>  | DTW <sup>2</sup>                            | Purge Vol.<br>(ml)             | pН   | Sp. Cond.<br>(uS/cm)     | DO<br>(mg/L)  | Temp<br>(°C)       | ORP<br>(mV)                 | Turbidity<br>(NTU) | Note color, odor, etc. |  |
|  | Begin Pumpi                                 | ing                            |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    | *                      |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
| •  |   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |
| Stabilization<br>Criteria <sup>3</sup>                               | •   |                                | ± 0.1 units  | ± 3%                     | ± 0.3 mg/L  |                    | ± 10 mV                     | ± 10% <sup>4</sup> |                        |  |
| <sup>1</sup> Collect field parar<br><sup>3</sup> Stabilization achie | neters in consistent<br>wed after 3 success | 3-5 minute intervals           | for Low-Flow methors with the second se | nod<br>nimum parameter : | <sup>2</sup> DTW: Total draws<br>subset: pH, sp. cond | lown should not ex | ceed 0.33 ft for Low        | -Flow method       |                        |  |
| <sup>4</sup> For turbidity readi                                     | ngs > 10 NTUs                               | <sup>5</sup> Low-flow target p | urge rate is 0.1 - 0.  | 5 L/min (0.03 - 0.1      | 3 gal/min)  | ,,,                |                             |                    |                        |  |
| Sample ID:   |   |                                |  |                          |   |                    | S                           | ample Time:        |                        |  |
| Analysis:  |   | (boron, calcium,               |  |                          | and TDS)  |                    |                             |                    |                        |  |
| L<br>L   | Other, specif                               | (total metals, Ra              | adium/226,/and   |                          |   |                    |                             |                    |                        |  |
| QC SAMPLE  | A 8   | ld Duplicate                   |  |                          | EQ Rinsate B  | ank                |                             |                    |                        |  |
| QC Sample ID   |   |                                |  |                          |   |                    |                             |                    |                        |  |
| Comments:  | -   | 2                              |  |                          |   |                    |                             |                    |                        |  |
|  | -   |                                |  |                          |   |                    |                             |                    |                        |  |
|  |   |                                |  |                          |   |                    |                             |                    |                        |  |

| SITE:   | TCM LP             | LF                             | Pro                | ject Number          |               | Well ID: <u>CPLF 4</u><br>Date: <u>ノのク24/18</u><br>Arrival Time to Well: <u>ノノ・4つ</u><br>Initial DTW (ft btc): <u>(フ.41)</u> |                           |                    |                        |  |
|---|--------------------|--------------------------------|--------------------|----------------------|---------------|--|---------------------------|--------------------|------------------------|--|
| Field Team:   |                    | Bill Scheer                    |                    |                      |               |  | _                         | Date:              | 10/24/18               |  |
| Weather/Tem   | 1p: 50             | KAN                            | ARM                | -                    |               |  | -<br>Arrival              | Time to Well:      | 11:40                  |  |
| Purge Metho   | d: 🗌 Blac          | lder 🗆                         | Peristaltic        | 🗆 Grab               | □ Other: _    |  | -<br>Initial D1           | W (ft btc):        | (7.41)                 |  |
| Pump Setting  | <b>F</b>           |                                |                    |                      |               |  |                           |                    | - <u>_</u>             |  |
|   |                    |                                |                    | -<br>Fie             | ld Parameter  | s  |                           |                    |                        |  |
| Time <sup>1</sup>   | DTW <sup>2</sup>   | Purge Vol.<br>(ml)             | рН                 | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L)  | Temp<br>(°C)   | ORP<br>(mV)               | Turbidity<br>(NTU) | Note color, odor, etc. |  |
|   | Begin Pumpi        | ng                             |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    | 0                              | .,                 |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
| Stabilization<br>Criteria <sup>3</sup>                                  | •                  |                                | ± 0.1 units        | ± 3%                 | ± 0.3 mg/L    |  | ± 10 mV                   | ± 10% <sup>4</sup> | •                      |  |
| <sup>1</sup> Collect field parame<br><sup>3</sup> Stabilization achieve | ed after 3 success | ive readings for Lov           | v-Flow method; min | nimum parameter :    |               | own should not ex<br>, and turbidity or D  | ceed 0.33 ft for Low<br>D | -Flow method       |                        |  |
| <sup>4</sup> For turbidity reading<br>Sample ID:                        |                    | <sup>5</sup> Low-flow target p |                    |                      |               |  | c                         | ample Time:        |                        |  |
|   |                    | (boron, calcium,               |                    |                      |               |  |                           | ample rime.        |                        |  |
|   | Appendix IV        | (total metals, R<br>y          | adium 226, and     | Radium 228).         | and ILDS)     |  |                           |                    |                        |  |
| QC SAMPLE :   | 🗆 Fie              | ld Duplicate                   |                    | ISD 🗆                | EQ Rinsate Bl | ank  | TOTAL PU                  | IRGED (ml):        |                        |  |
| QC Sample ID  | :                  |                                |                    |                      |               |  |                           | Sample Time:       |                        |  |
| Comments:   |                    |                                |                    |                      |               |  |                           |                    |                        |  |
|   |                    |                                |                    |                      |               |  |                           |                    |                        |  |

| SITE:                                  | TCM LF  | LF  | Proj                   | ject Number:         |   | <b>.</b> .                  | Well ID:    | LPLF5<br>10-24-13<br>11:45 |                        |
|--|---|---|------------------------|----------------------|---|-----------------------------|-------------|----------------------------|------------------------|
| Field Team:                            |   | Bill Scheer                                     |                        |                      |   |                             |             | Date:                      | 10.24-13               |
| Weather/Te                             | mp:   | Clou  | 1054                   | Looc                 | _   |                             | Arrival     | Time to Well:              | 11:45                  |
| Purge Meth                             | od: 🗆 Bla   |   | Peristaltic            | 🗆 Grab               | □ Other:  |                             | Initial DT  | W (ft btc):                |                        |
| Pump Settir                            | ng <sup>5</sup> :   |   |                        | Notes:               |   |                             |             |                            |                        |
|  | <u> </u>  |   |                        |                      | d Parameters  | S                           |             |                            |                        |
| Time <sup>1</sup>                      | DTW <sup>2</sup>  | Purge Vol.<br>(ml)                              | рН                     | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L)  | Temp<br>(°C)                | ORP<br>(mV) | Turbidity<br>(NTU)         | Note color, odor, etc. |
| 1                                      | Begin Pump  |   |                        | (                    | (   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
|  |   |   |                        |                      |   |                             |             |                            |                        |
| Stabilization<br>Criteria <sup>3</sup> |   | •   | ± 0.1 units            | ± 3%                 | ± 0.3 mg/L  |                             | ± 10 mV     | ± 10% <sup>4</sup>         |                        |
|  |   | nt 3-5 minute interval<br>ssive readings for Lo |                        |                      | <sup>2</sup> DTW: Total drawo<br>ubset: pH, sp. cond. |                             |             | v-Flow method              |                        |
| <sup>4</sup> For turbidity read        |   |   | ourge rate is 0.1 - 0. |                      |   | • 11438.2390.43986382394999 |             |                            |                        |
| Sample ID:                             | p   |   |                        |                      |   |                             | S           | Sample Time:               |                        |
| Analysis:                              | and the second se | l((boron, calcium                               |                        |                      | and TDS)  |                             |             |                            |                        |
|  | and the second second   | /(total métals, R<br>sify                       |                        |                      |   |                             |             |                            |                        |
| QC SAMPLE                              |   | ield Duplicate                                  |                        |                      | EQ Rinsate B  | lank                        | TOTAL PL    | JRGED (ml)                 |                        |
| QC Sample I                            |   | era Daplicato                                   |                        |                      | _ <u>_</u>  |                             |             |                            |                        |
| Comments:                              |   | NO  | NATER                  | 1.12                 | WEL   | L                           | 401         | campio milo.               |                        |
| oominenta.                             |   | ļ <u>~</u>                                      |                        | ~                    | 0000  |                             |             |                            |                        |

| SITE:   | TCM LPL                                      | F                    | Proj              | ect Number:                |                     | Well ID: LPLF 7R |                      |                    |                        |  |
|---|--|----------------------|-------------------|----------------------------|---------------------|------------------|----------------------|--------------------|------------------------|--|
| Field Team:                                   |  | Bill Scheer          |                   |                            |                     |                  |                      | Date:              | 10-24-18               |  |
| Weather/Ter                                   | mp:  | LLOUT.               | 35 \$             | Laa                        |                     |                  | Arrival              | Time to Well:      | 9:30                   |  |
| Purge Metho                                   | od: 🗆 Blad                                   | der tau              | Peristaltic       | 🗌 Grab                     |                     |                  |                      | W (ft btc):        | 21.34                  |  |
| Pump Settin                                   | g⁵: <u>\00</u>                               | mulin                | (~                | Notes:                     |                     |                  |                      |                    | 57 (F                  |  |
|   |  |                      |                   | Field                      | d Parameter         | S                | -                    |                    | and the second second  |  |
| Time <sup>1</sup>                             | DTW <sup>2</sup>                             | Purge Vol.<br>(ml)   | рН                | Sp. Cond.<br>(uS/cm)       | DO<br>(mg/L)        | Temp<br>(°C)     | ORP<br>(mV)          | Turbidity<br>(NTU) | Note color, odor, etc. |  |
| 5   | Begin Pumpin                                 | og                   |                   |                            |                     |                  |                      |                    |                        |  |
| 10  |  | 1000                 | 6.2               | 29148                      | 1.18                | 12.7             |                      | 3.8                |                        |  |
| 15  |  | 1500                 | 5,95              | 2938                       | 0,2                 | 12.7             |                      | 29                 |                        |  |
| 20  |  | 2000                 | 5.98              | 2933                       | ,34                 | 12.7             |                      | 2,9                |                        |  |
|   |  |                      |                   |                            |                     |                  |                      |                    |                        |  |
|   |  |                      |                   |                            |                     |                  |                      |                    |                        |  |
|   |  |                      |                   |                            |                     |                  |                      |                    | ·                      |  |
|   |  |                      |                   |                            |                     |                  |                      |                    |                        |  |
|   |  |                      |                   |                            |                     |                  |                      |                    |                        |  |
|   |  |                      |                   |                            |                     |                  |                      |                    |                        |  |
|   |  |                      |                   |                            |                     |                  |                      | =                  |                        |  |
|   |  |                      |                   |                            |                     |                  | *                    |                    |                        |  |
|   |  |                      |                   |                            | -                   |                  |                      |                    | e e                    |  |
| -   |  |                      |                   |                            |                     | 4                |                      |                    |                        |  |
|   |  |                      |                   |                            |                     | 2                |                      |                    |                        |  |
| Stabilization<br>Criteria <sup>3</sup>        | •  | •                    | ± 0.1 units       | ± 3%                       | ± 0.3 mg/L          |                  | ± 10 mV              | ± 10% <sup>4</sup> | •                      |  |
| <sup>3</sup> Stabilization achi               | meters in consistent<br>eved after 3 success | sive readings for Lo | w-Flow method; mi | nimum parameter s          | ubset: pH, sp. cond |                  | ceed 0.33 ft for Lov | v-Flow method      |                        |  |
| <sup>4</sup> For turbidity read<br>Sample ID: | 102418                                       |                      |                   | .5 L/min (0.03 - 0.13<br>2 | s gavmin)           |                  | 5                    | Sample Time:       | 9:50                   |  |
| Analysis:                                     | Appendix                                     |                      |                   |                            | and TDS)            |                  |                      | •                  | 1                      |  |
| ,   |  |                      | tadium 226, and   |                            |                     |                  |                      |                    |                        |  |
|   | Other, speci                                 |                      | . /               | 10.00                      |                     |                  |                      |                    | -                      |  |
| QC SAMPLE                                     |  | eld Duplicate        | A MS/             | MSD 🗆                      | EQ Rinsate B        | llank            |                      | JRGED (ml):        |                        |  |
| QC Sample I                                   | D:   |                      |                   |                            |                     |                  | QC                   | Sample Time:       |                        |  |
| Comments:                                     |  |                      |                   |                            |                     |                  |                      |                    |                        |  |
|   |  |                      |                   |                            |                     | *                |                      |                    |                        |  |

| SITE:   | TCM LP  | LF                  | Pro               | oject Number         |   | Well ID: LPLF 8                           |                          |                    |                        |  |
|---|---|---------------------|-------------------|----------------------|---|---|--------------------------|--------------------|------------------------|--|
| Field Team:                                     |   | Bill Scheer         |                   |                      |   |   | _                        | Date               | : 10-24-18             |  |
| Weather/Te                                      | mp:   | LOUD                | 5\$ (             | 000                  |   |   | Arrival                  |                    | : 10:10                |  |
| Purge Methe                                     | od: 🗌 Blac                                    | lder 🖂              | Peristaltic       | Grab                 |   |   |                          |                    | 14,54                  |  |
| Pump Settin                                     | ng⁵: _/ơ                                      | O ML                | Min               |                      |   |   |                          |                    |                        |  |
|   |   |                     |                   |                      | d Parameter   | S   |                          |                    |                        |  |
| Time <sup>1</sup>                               | DTW <sup>2</sup>                              | Purge Vol.<br>(ml)  | рН                | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L)  | Temp<br>(°C)                              | ORP<br>(mV)              | Turbidity<br>(NTU) | Note color, odor, etc. |  |
| 5   | Begin Pumpir                                  | ng                  |                   |                      |   |   |                          |                    |                        |  |
| 10  | 1465  | 1000                | 627               | 380                  | 199   | 13.7                                      |                          | 3.4                |                        |  |
| 15  | 14.71   | 1500                | 615               | Bob                  | .91   | 13.6                                      |                          | 3.4                |                        |  |
| 20  | 14.78   | 2000                | 613               | 3805                 | ,93   | 13.6                                      |                          | 3.4                |                        |  |
|   |   |                     | 0)                |                      |   |   |                          |                    |                        |  |
|   |   |                     |                   |                      |   |   |                          |                    |                        |  |
|   |   |                     |                   |                      |   |   |                          |                    |                        |  |
|   |   |                     |                   |                      |   |   |                          |                    |                        |  |
|   |   |                     |                   |                      |   |   |                          |                    |                        |  |
|   |   |                     |                   |                      |   |   |                          |                    |                        |  |
|   |   |                     |                   |                      |   |   |                          |                    |                        |  |
|   |   |                     |                   |                      |   |   |                          |                    |                        |  |
|   |   |                     |                   |                      |   |   |                          |                    |                        |  |
|   |   |                     |                   |                      |   |   |                          |                    |                        |  |
|   |   | (                   |                   |                      |   | -   |                          |                    |                        |  |
| Stabilization<br>Criteria <sup>3</sup>          | •   |                     | ± 0.1 units       | ± 3%                 | ± 0.3 mg/L  |   | ± 10 mV                  | ± 10% <sup>4</sup> |                        |  |
| <sup>3</sup> Stabilization achiev               | eters in consistent 3<br>ved after 3 successi | ve readings for Low | -Flow method; min | imum parameter su    | <sup>2</sup> DTW: Total drawd<br>ibset: pH, sp. cond. | own should not exc<br>and turbidity or DC | eed 0.33 ft for Low<br>) | Flow method        |                        |  |
| <sup>4</sup> For turbidity readin<br>Sample ID: | 102418  |                     |                   | 5 L/min (0.03 - 0.13 | gal/min)  |   | s                        | ample Time:        | 10:30                  |  |
|   | Appendix III (                                |                     |                   |                      | and TDS)  |   | 0                        |                    | 10 30                  |  |
|   | Appendix IV (                                 | total metals, Ra    |                   |                      |   |   |                          |                    |                        |  |
|   | Other, specify                                |                     |                   |                      |   |   |                          |                    |                        |  |
| QC SAMPLE :                                     | 1 -   | d Duplicate         | □ MS/N            | ISD 🗆                | EQ Rinsate Bl   | ank                                       |                          |                    | 2000                   |  |
| QC Sample ID                                    | : <u> </u>                                    | P                   |                   |                      |   |   | QC S                     | ample Time:        |                        |  |
| Comments:                                       | -   |                     |                   |                      |   |   |                          |                    |                        |  |
|   |   |                     |                   |                      |   |   |                          |                    |                        |  |

ADDRESS 1317 South 13th Ave., Kelso, WA 98626 PHONE 1 360 577 7222 FAX 1 360 636 1068

Work Order No.: 80819

Chain of Custody

| Client Name: 3 // TransAlta Centralia Mining Company<br>Address: // 913 Big Hanaford Road |                        |                    |                    |                                   |             | μ,  | Rill to:  |                 | ia Si                        | Rill School        | Pr   |              |             |       |          |  |
|---|------------------------|--------------------|--------------------|-----------------------------------|-------------|---|-----------|-----------------|------------------------------|--------------------|--|--------------|-------------|-------|----------|--|
| 913 Big Hanaford Road   | ning Comps             | anv                |                    |                                   |             | 5 8   |           |                 |                              |                    |  | te lin       |             |       |          |  |
|   | dines comp             | 4117               |                    |                                   |             | 3   | Address.  |                 | = 5<br>                      | 2 Rich             | 11 alisAlta Certuralia Mining<br>013 Rig Hanaford Boad | ralla IV     | 5<br>UIU    |       |          |  |
| City, State ZIP: Centralia, WA 98531  |                        |                    |                    | ĺ                                 |             | 10  | tv. Sta   | City. State ZIP | <u>5 Ŭ</u>                   | Centralia, WA      | AW E   | 98531        | 2           |       |          |  |
| bill scheer@transalta.com   | com                    | Phone              | 360-3              | 30-2332                           |             | 15  | Email:    |                 | ם:<br>                       | l sche             | bill scheer@transalta.com                              | nsalta.c     | E           | #od   |          |  |
| Project Name: LPLF CCR  |                        |                    |                    | 家、翻送言                             |             | COMPACT<br>A COMPACT                                | RE        | QUES            | FED A                        | REQUESTED ANALYSIS | SIS  |              |             |       |          | TAT N  |
|   |                        |                    |                    |                                   |             |   |           | L               |                              |                    |  |              |             |       |          |  |
| P.O. Number: 4700075456 Line90  |                        |                    |                    |                                   |             |   |           |                 |                              |                    |  |              |             |       |          | -  |
| Sampler's Name:   Bill Scheer   |                        |                    |                    |                                   |             |   |           |                 |                              |                    |  |              |             |       |          |  |
| SAMPLE RECEIPT  | <b>IIII</b>            |                    |                    |                                   |             |   |           |                 |                              |                    |  |              |             |       | <b>L</b> | Dav  |
| Temperature (C):  | Temp Blank Present     | ik Present         |                    |                                   |             |   |           | _               |                              |                    |  |              |             |       |          | Z 5 Dav 50%                                  |
| Received Intact: A Mile Yes No  | N/A                    | Wet Ice / Blue Ice |                    |                                   |             |   |           |                 |                              |                    |  |              |             |       |          |  |
| Cooler Custody Seals: Yes No  | N/A                    | Total Containers:  |                    |                                   |             |   |           |                 |                              |                    |  |              |             |       |          | Diases rall for                              |
| Sample Custody Seals: 👘 Yes No  |                        |                    | 6L2                |                                   |             | ə   |           |                 |                              |                    |  |              |             |       | <u></u>  | availability                                 |
| SampleIdentification  | Date<br>Sampled        | Time<br>Sampled    | l<br>of Contain    | : unibsЯ \ 0                      | 240 C / TD2 | Т рН \ А(<br>тругорания<br>Тругорания<br>Тругорания |           | \$0\$ / ¥       | - sløteM \ D(<br>sløteM \ A( | ZZ muibeA (        |  |              |             |       |          | Due Date:                                    |
|   |                        |                    | 'ON                |                                   |             | _   |           |                 |                              |                    |  |              |             |       |          | <b>Comments</b>                              |
| ۵<br>۵  | 01/07/2019             | 14:15              | m                  |                                   | ×           |   |           | X               | хх                           |                    |  |              |             |       |          | Boron and Calcium needed                     |
| 010719-CCR-LPLF7R GW 01   | 01/07/2019             | 14:55              |                    |                                   |             | ×   |           |                 |                              |                    |  |              |             |       |          | Chloride                                     |
|   |                        |                    |                    |                                   |             |   |           |                 | -                            | $\neg$             |  |              |             |       |          |  |
|   |                        |                    |                    |                                   |             |   |           |                 | _                            |                    |  |              | _           | _     | _        |  |
|   |                        | -                  |                    |                                   | $\neg$      |   |           |                 |                              |                    |  |              |             |       |          |  |
|   |                        |                    |                    |                                   |             |   | +         |                 |                              |                    |  |              | _           |       |          |  |
|   |                        |                    | <br>               |                                   |             | <u> </u>  | _         |                 |                              |                    |  |              |             |       | <u> </u> |  |
|   |                        |                    |                    |                                   |             |   |           |                 | ╏─┼                          |                    |  |              |             |       |          |  |
|   |                        |                    |                    |                                   | -           | _   | +         | 1               |                              |                    |  |              | +           |       |          |  |
| Dissolved   | Ag, Al, As, B, Ba, Be, | Ca, Cd             | Co, Cr, Cu, Fe, K, | K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, | Mn, Mc      | , Na, N   | i, P.     | - as            | Se, Si, S                    | Sn, Sr, 7          | Sr, TI, V, Zn  | Zn, Zr       |             | Addit | ional I  | <u>     </u><br>Additional Methods Available |
|   | Ag, Al, As, B, Ba, Be, | R                  |                    | K, Li, Mg,                        | Mn, Mo      | Mo, Na, Ni, P,                                      | i, P, Pb, | S,              | Se, Si, Sn,                  | sn, Sr, 1          | Sr, Tl, V, Zn, Zr                                      | , Zr         |             |       | Upo      | Upon Request                                 |
|   | <b>RELINQUISHED BY</b> | ED BY              |                    | and the second                    |             |   |           |                 |                              |                    | See RI   | CEIN         | RECEIVED BY |       |          |  |
| Print Name  | <i>▲</i>               | <b>s</b> gnature   | Da                 | Date/Time                         |             |   |           | ²rint.∖         | ame                          | Print Name         |  |              | Signature   | ure   |          | pate/Jime                                    |
| William Scheer  |                        |                    | 01/02/2019         | 2019                              |             |   | Ł         | 1/02            | 2                            | 1                  |  | M            | ~           |       |          | 117/19/205                                   |
|   | •                      | 1                  |                    |                                   |             |   |           |                 |                              |                    | Ð  | $\backslash$ |             |       |          |  |

## TransAlta Centralia Mining LLC Groundwater Purging and Sampling Form

| SITE:                                  | TransAlta Ce              | entralia Mine      |             | Project:             | LPLF         | GW CCR                  | 2           | Well ID:           | LPLF7R_                |
|--|---------------------------|--------------------|-------------|----------------------|--------------|-------------------------|-------------|--------------------|------------------------|
| Field Team:                            |                           | Bill Sche          |             |                      |              |                         |             | Date:              | 1/7/19                 |
| Weather/Ter                            | np: <u> </u>              | -05,00             | ŧ           | Cococ                |              |                         | Arrival 1   | Fime to Well:      | 14:35                  |
| Purge Metho                            | od: 🔲 Blade               | der 🏹 F            | Peristaltic | 🗌 Grab               | □ Other:     |                         | Initial DT  | W (ft bed):        | (20.98)                |
| Pump Settin                            | g⁵: <u>/5</u> e           | oml/m              | in          | Notes:               |              |                         |             |                    |                        |
|  |                           |                    |             | Field                | d Parameters | 3                       |             |                    |                        |
| Time <sup>1</sup>                      | DTW <sup>2</sup>          | Purge Vol.<br>(ml) | рН          | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L) | Temp<br>(°C)            | ORP<br>(mV) | Turbidity<br>(NTU) | Note color, odor, etc. |
| 5                                      | Begin Pumpin              | g                  |             |                      |              |                         |             |                    |                        |
| 10                                     | (20.25)                   | 190                | 6,1)        | 2863                 | 91           | 12,8                    |             | 1.8                |                        |
| 15                                     | (21.30)                   | 1500               | 6.05        | 286)                 | 190          | 12.9                    |             | 1.5                | -                      |
| 20                                     | (21:32)                   | 3000               | 6.04        | 2865                 | .90          | 12.9                    |             | 1.4                |                        |
|  |                           |                    | r           |                      |              |                         |             |                    |                        |
|  |                           |                    |             |                      |              |                         |             |                    |                        |
|  |                           |                    |             |                      |              |                         |             |                    |                        |
|  |                           |                    |             |                      |              |                         |             |                    |                        |
|  |                           |                    |             |                      |              |                         |             |                    |                        |
|  |                           |                    |             |                      |              |                         |             | -                  |                        |
| Stabilization<br>Criteria <sup>3</sup> | -<br>meters in consistent | -                  | ± 0.1 units | ± 3%                 | ± 0.3 mg/L.  | -<br>Sown should not ex | ± 10 mV     | ± 10% 4            | Ē                      |

<sup>3</sup> Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO <sup>4</sup> For turbidity readings > 10 NTUs <sup>5</sup> Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

| Туре | Treatment         | Quantity | Container Type |
|------|-------------------|----------|----------------|
| 2    | None              |          | Plastic        |
| 1    | Unfiltered, HNO3  |          | Plastic        |
|      | Filter, HNO3      |          | Plastic        |
|      | Unfiltered, H2SO4 |          | Plastic        |
|      | Filter, HCL       |          | Glass          |
|      | H2SO4             |          | Glass          |
|      |                   |          |                |

| Sample Time       | 14:55   |
|-------------------|---------|
| Confidence        | (200D)  |
| Sample Treatment  | NA      |
| Field Instrument  | 3000    |
| Total Purged (ml) | YSI PRO |

.

Comments:

## TransAlta Centralia Mining LLC Groundwater Purging and Sampling Form

| SITE:                                  | TransAlta Ce     | entralia Mine      |             | Project:             | LPLF         | GWCCR        | -           | Well ID:           | LPLF2R                 |
|--|------------------|--------------------|-------------|----------------------|--------------|--------------|-------------|--------------------|------------------------|
| Field Team:                            |                  | Bill Sche          | er          |                      |              |              |             | Date:              | 1/7/19                 |
| Weather/Tei                            | mp:              | Lovo               | 5 Ł         | Coor                 |              |              | Arrival 3   | Fime to Well:      | 13:55                  |
| Purge Metho                            |                  |                    | Peristaltic | 🗆 Grab               | □ Other:     |              | Initial DT  | W (ft bgl):        | (4,98)                 |
| Pump Settin                            | g⁵: <b>_2</b> ⊘  | o MI/              | 1 m         | Notes:               |              |              |             |                    |                        |
|  |                  |                    |             |                      | d Parameter  | S            |             |                    |                        |
| Time <sup>1</sup>                      | DTW <sup>2</sup> | Purge Vol.<br>(ml) | рН          | Sp. Cond.<br>(uS/cm) | DO<br>(mg/L) | Temp<br>(°C) | ORP<br>(mV) | Turbidity<br>(NTU) | Note color, odor, etc. |
| 5                                      | Begin Pumpin     | Ŋ                  |             |                      |              |              |             |                    |                        |
| 10                                     | (5.07)           | 2000               | 6.19        | 3915                 | .93          | 13.3         |             | 2                  |                        |
| 15                                     | (5.09)           | 3000               | , ,         | 3918                 | .85          | 13.3         |             | 1.4                |                        |
| 20                                     | (5,11)           | 4000               |             | 39121                | ,8           | 13.4         |             | 1.3                |                        |
|  | <b>`</b>         |                    |             |                      |              |              |             |                    |                        |
|  |                  |                    |             |                      |              |              |             |                    |                        |
|  |                  |                    |             |                      |              |              |             |                    |                        |
|  |                  |                    |             |                      |              |              |             |                    |                        |
| _                                      |                  |                    |             |                      |              |              |             |                    |                        |
|  |                  |                    |             |                      |              |              |             |                    |                        |
| Stabilization<br>Criteria <sup>3</sup> | •                |                    | ± 0.1 units | ± 3%                 | ± 0.3 mg/L   |              | ± 10 mV     | ± 10% <sup>4</sup> | •                      |

<sup>1</sup> Collect field parameters in consistent 3-5 minute intervals for Low-Flow method <sup>2</sup> DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method

<sup>3</sup> Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
 <sup>4</sup> For turbidity readings > 10 NTUs
 <sup>5</sup> Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

| Туре     | Treatment         | Quantity | Container Type |
|----------|-------------------|----------|----------------|
| 2        | None              | 250      | Piastic        |
| 1        | Unfiltered, HNO3  | 125:4    | Plastic        |
| Ŕ        | Filter, HNO3      | 100      | Plastic        |
| <b>.</b> | Unfiltered, H2SO4 | · ·      | Plastic        |
|          | Filter, HCL       |          | Glass          |
|          | H2SO4             |          | Glass          |

| Sample Time       | 14:15   |
|-------------------|---------|
| Confidence        | Good    |
| Sample Treatment  | NA      |
| Field Instrument  | 4000    |
| Total Purged (ml) | 451 PRO |

Comments:

Appendix B Laboratory Report



Dennis Morr Transalta Centralia Mining, LLC 913 Big Hanaford Rd Centralia, WA 98531

## Laboratory Results for: LPLF CCR

Dear Dennis,

Enclosed are the results of the sample(s) submitted to our laboratory May 31, 2018 For your reference, these analyses have been assigned our service request number **K1805095**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3356. You may also contact me via email at Kurt.Clarkson@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

noe D. Dan

for Kurt Clarkson Sr. Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626 PHONE +1 360 577 7222 | FAX +1 360 636 1068 ALS Group USA, Corp. dba ALS Environmental



## Narrative Documents

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

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Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Ground Water

Service Request: K1805095 Date Received: 05/31/2018

### **CASE NARRATIVE**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS).

### Sample Receipt:

Six ground water samples were received for analysis at ALS Environmental on 05/31/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

### <u>Metals:</u>

No significant anomalies were noted with this analysis.

### General Chemistry:

No significant anomalies were noted with this analysis.

Approved by

noe D. Daw

Date 06/15/2018



## SAMPLE DETECTION SUMMARY

| LIENT ID: 053018-CCR-LPLF1 |         | Lab  | D: K1805 | <b>6095-001</b> |          |              |
|----------------------------|---------|------|----------|-----------------|----------|--------------|
| Analyte                    | Results | Flag | MDL      | MRL             | Units    | Method       |
| Solids, Total Dissolved    | 2490    |      |          | 5.0             | mg/L     | SM 2540 C    |
| Chloride                   | 29.1    |      |          | 1.0             | mg/L     | 9056A        |
| рН                         | 6.88    |      |          |                 | pH Units | SM 4500-H+ E |
| Sulfate                    | 1320    |      |          | 50              | mg/L     | 9056A        |
| Boron                      | 0.559   |      |          | 0.021           | mg/L     | 6010C        |
| Calcium                    | 211     |      |          | 0.021           | mg/L     | 6010C        |

| CLIENT ID: 053018-CCR-LPLF2R |         | Lab  | DID: K1805 | 5095-002 |          |              |
|------------------------------|---------|------|------------|----------|----------|--------------|
| Analyte                      | Results | Flag | MDL        | MRL      | Units    | Method       |
| Solids, Total Dissolved      | 3490    |      |            | 5.0      | mg/L     | SM 2540 C    |
| Chloride                     | 8.3     |      |            | 1.0      | mg/L     | 9056A        |
| рН                           | 6.60    |      |            |          | pH Units | SM 4500-H+ B |
| Sulfate                      | 1880    |      |            | 50       | mg/L     | 9056A        |
| Boron                        | 0.351   |      |            | 0.021    | mg/L     | 6010C        |
| Calcium                      | 499     |      |            | 0.21     | mg/L     | 6010C        |

| CLIENT ID: 053018-CCR-LPLF5 |         | Lab  | D: K1805 | 5095-003 |          |              |
|-----------------------------|---------|------|----------|----------|----------|--------------|
| Analyte                     | Results | Flag | MDL      | MRL      | Units    | Method       |
| Solids, Total Dissolved     | 1600    |      |          | 5.0      | mg/L     | SM 2540 C    |
| Chloride                    | 3.1     |      |          | 1.0      | mg/L     | 9056A        |
| рН                          | 7.36    |      |          |          | pH Units | SM 4500-H+ B |
| Sulfate                     | 665     |      |          | 50       | mg/L     | 9056A        |
| Boron                       | 0.099   |      |          | 0.021    | mg/L     | 6010C        |
| Calcium                     | 335     |      |          | 0.021    | mg/L     | 6010C        |

| CLIENT ID: 053018-CCR-LPLF7R |         | Lab  | DID: K1805 | 5095-004 |          |              |
|------------------------------|---------|------|------------|----------|----------|--------------|
| Analyte                      | Results | Flag | MDL        | MRL      | Units    | Method       |
| Solids, Total Dissolved      | 2260    |      |            | 5.0      | mg/L     | SM 2540 C    |
| Chloride                     | 7.5     |      |            | 1.0      | mg/L     | 9056A        |
| рН                           | 6.57    |      |            |          | pH Units | SM 4500-H+ B |
| Sulfate                      | 1510    |      |            | 1.0      | mg/L     | 9056A        |
| Boron                        | 0.320   |      |            | 0.021    | mg/L     | 6010C        |
| Calcium                      | 205     |      |            | 0.021    | mg/L     | 6010C        |

| CLIENT ID: 053018-CCR-LPLF8 |         |      |     |       |          |              |
|-----------------------------|---------|------|-----|-------|----------|--------------|
| Analyte                     | Results | Flag | MDL | MRL   | Units    | Method       |
| Solids, Total Dissolved     | 3540    |      |     | 5.0   | mg/L     | SM 2540 C    |
| Chloride                    | 7.2     |      |     | 1.0   | mg/L     | 9056A        |
| рН                          | 6.15    |      |     |       | pH Units | SM 4500-H+ B |
| Sulfate                     | 3670    |      |     | 1.0   | mg/L     | 9056A        |
| Boron                       | 0.936   |      |     | 0.021 | mg/L     | 6010C        |
| Calcium                     | 430     |      |     | 0.021 | mg/L     | 6010C        |



### SAMPLE DETECTION SUMMARY

| CLIENT ID: FD           |         |      |     |       |          |              |
|-------------------------|---------|------|-----|-------|----------|--------------|
| Analyte                 | Results | Flag | MDL | MRL   | Units    | Method       |
| Solids, Total Dissolved | 2320    |      |     | 5.0   | mg/L     | SM 2540 C    |
| Chloride                | 8.1     |      |     | 1.0   | mg/L     | 9056A        |
| рН                      | 6.47    |      |     |       | pH Units | SM 4500-H+ B |
| Sulfate                 | 1660    |      |     | 1.0   | mg/L     | 9056A        |
| Boron                   | 0.331   |      |     | 0.021 | mg/L     | 6010C        |
| Calcium                 | 210     |      |     | 0.021 | mg/L     | 6010C        |



# Sample Receipt Information

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

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### SAMPLE CROSS-REFERENCE

| SAMPLE #     | CLIENT SAMPLE ID  | DATE      | <u>TIME</u> |
|--------------|-------------------|-----------|-------------|
| K1805095-001 | 053018-CCR-LPLF1  | 5/30/2018 | 1215        |
| K1805095-002 | 053018-CCR-LPLF2R | 5/30/2018 | 1340        |
| K1805095-003 | 053018-CCR-LPLF5  | 5/30/2018 | 1420        |
| K1805095-004 | 053018-CCR-LPLF7R | 5/30/2018 | 1240        |
| K1805095-005 | 053018-CCR-LPLF8  | 5/30/2018 | 1310        |
| K1805095-006 | FD                | 5/30/2018 |             |

K1805095



ADDRESS 1317 South 13th Ave., Kelso, WA 98626 PHONE 1 360 577 7222 FAX 1 360 636 1068

## Work Order No.: 80819

Chain of Custody

Part of the ALS Group A Campbell Brothers Limited Company

| Project Manager: Bill Sche | Bill Scheer                                  |                              |                 |             |                 |   |             |               |                           |           |                                     | Bill Scheer |                |       |  |            |               |               |          |          |             |              |             |                              |
|----------------------------|--|------------------------------|-----------------|-------------|-----------------|---|-------------|---------------|---------------------------|-----------|-------------------------------------|-------------|----------------|-------|--|------------|---------------|---------------|----------|----------|-------------|--------------|-------------|------------------------------|
| Client Name: TransAlt      | a Centralia                                  | a Mining Com                 | pany            |             |                 |   |             |               |                           |           | Company: TransAlta Centralia Mining |             |                |       |  |            |               |               |          |          |             |              |             |                              |
|                            | Hanaford I                                   | Road                         |                 |             |                 | Address: 913                              |             |               |                           |           |                                     |             |                |       |  |            |               |               |          |          |             |              |             |                              |
| City, State ZIP: Centralia | i, WA 985                                    | 31                           |                 |             |                 |   |             |               |                           |           | City                                | , Sta       | te ZIP         |       |  |            | a, WA         |               |          |          |             |              |             |                              |
| Email: bill_sche           | er@transa                                    | alta.com                     |                 | Phone:      | 360             | )-33(                                     | 0-23        | 32            |                           |           | Em                                  |             | <u>())</u> 365 |       |  |            | er@tra        | <u>ansalt</u> | a.con    | n        | 1           | p <b>o</b> # | <u> </u>    |                              |
| Project Name: LPLF CC      | R  |                              |                 |             | <u> (</u> ).335 | Netes                                     | di di di    |               | <u>.</u> 9984             |           | (georg                              | RE          | QUES           | TEE   | ) AN   | ALY        | SIS 🔅         |               |          | <u> </u> | Y 1997      | ang sa       | <u>haad</u> | TAT MARK                     |
| Project Number:            |  |                              |                 |             |                 |   | l i         | l             | Į                         | ł         | Į į                                 | ļ           |                |       |  |            |               | ļ             | ļ        |          |             |              |             | 🔲 Routine 21da               |
| P.O. Number: 470007        | 5456 Line                                    | 90                           |                 |             |                 |   |             |               |                           |           |                                     | 1           |                |       |  |            |               |               |          |          |             |              |             | Same Day 100                 |
| Sampler's Name: Bill Sche  | er   |                              |                 |             |                 |   |             | ľ             |                           |           | 1                                   |             |                |       |  |            |               |               |          |          |             |              |             | Next Day ***                 |
| S                          | AMPLE R                                      | ECEIPT                       |                 |             |                 |   |             |               | 1                         |           |                                     |             |                |       |  |            |               |               |          |          |             |              |             | 3 Day                        |
| Temperature (°C):          |  | Temp Bla                     | nk Present      | N.          |                 |   |             |               |                           |           |                                     |             |                |       |  |            |               |               | Ì        |          |             |              |             | 5 Day 50                     |
| Received Intact:           | Yes  | No N/A                       | Wet Ice / I     | Blue Ice    |                 |   |             |               | Í                         |           | ł                                   |             |                |       |  |            |               |               |          |          |             | }            |             | Surcharges.                  |
| Cooler Custody Seals:      | Yes  | No N/A                       | Total Cont      | tainers:    |                 |   |             |               |                           |           |                                     |             |                |       |  |            |               |               |          |          |             |              |             | Please call for              |
| Sample Custody Seals:      | Yes  | No N/A                       |                 |             | ler.            |   |             |               |                           |           |                                     |             |                |       |  |            |               |               |          |          |             |              |             | availability                 |
| Sample Identification      | Matrix                                       | Date<br>Sampled              | Time<br>Sampled | Lab ID      | of Contain      |   | uo,         | Calcium       | Chloride                  | Fluoride  |                                     | Sulfate     | s              |       |  |            |               |               |          |          |             |              |             | Due Date:                    |
|                            |  |                              |                 |             | Ś               |   | Boron       |               |                           |           | Hd                                  |             | TDS            |       |  |            |               |               |          |          |             |              |             | Comments                     |
| 053018 - CCR - LPLF1       | GW   | 05/30/2018                   | 12:15           |             | 3               |   | X           | X             | X                         | X         | X                                   | X           | X              |       |  |            |               |               |          |          |             |              |             |                              |
| 053018 - CCR - LPLF2R      | GW   | 05/30/2018                   | 13:40           |             | 9               |   | Х           | X             | X                         | X         | X                                   | X           | X              |       | <u>]                                    </u> |            |               |               |          |          |             |              |             | MS/MSD                       |
| 053018 - CCR - LPLF5       | GW   | 05/30/2018                   | 14:20           |             | 2               |   | Х           | Х             | x                         | X         | X                                   | X           | X              |       |  |            |               |               |          |          |             |              |             |                              |
| 053018 - CCR - LPLF7R      | GW   | 05/30/2018                   | 12:40           |             | 3               |   | X           | X             | X                         | X         | X                                   | X           | X              |       |  |            |               |               |          |          |             |              |             |                              |
| 053018 - CCR - LPLF8       | GW   | 05/30/2018                   | 13:10           |             | 3               |   | X           | X             | X                         | X         | X                                   | X           | X              |       | T  |            |               |               |          | 1        |             |              |             |                              |
| FD                         | GW   |                              |                 |             | 3               |   | X           | X             | X                         | x         | X                                   | X           | X              |       |  |            |               |               |          |          |             |              |             | ······                       |
|                            |  |                              |                 |             |                 |   |             |               |                           |           |                                     |             |                | _     |  |            |               |               |          |          |             | <u> </u>     |             |                              |
|                            |  |                              |                 | ļ           |                 |   |             |               |                           |           |                                     |             |                |       |  |            |               |               |          |          |             |              | ┝━━┥        |                              |
|                            |  |                              |                 |             |                 |   |             |               |                           |           |                                     |             |                |       |  |            |               |               |          | _        |             | ┿┯┥          | <b> </b>    |                              |
| ·····                      |  |                              |                 | +           |                 |   |             |               |                           |           |                                     |             |                | -+    |  |            |               |               | +        |          |             | ╆╌╋          |             |                              |
| Dissolved                  | A  | 1I<br>g, Al, As, B, Ba       | a, Be, Ca, Cd.  | , Co, Cr, ( | с               | 2, K, 1                                   | I<br>_i, Mo | g, Mr         | ∟<br>1, Мо                | , Na.     | Ni, P                               | P, Pb.      | Sb, Se         | , Si. | <u>ا</u><br>Sn, S                            | Sr, Tl.    | V, Zn         | <br>Zr        | <u> </u> |          | Âd          | ditio        | nall        | Methods Availabl             |
| [otal                      | A  | g, Al, As, B, Ba<br>LINQUISH | a, Be, Ça, Cd,  |             |                 |   |             |               |                           |           |                                     |             |                |       |  |            | V, Zn         |               | VED      | BY       | <b>1</b> 88 | しいき いちいちいん   | i dalah Mat | n Request                    |
|                            |  |                              | grature         |             |                 | Dat                                       | e/Ti        | me            |                           |           |                                     | P           | rint Na        | ame   | e  |            |               |               | N        | gnat     | ure         |              | T           | Date/Time                    |
| Print Name                 | <ul> <li>Control (1997) A. (1997)</li> </ul> |                              |                 |             | 1.5.3.232       | 5 ( S - S - S - S - S - S - S - S - S - S |             | er a straight | <ul> <li>S2523</li> </ul> | 1.111.121 | 1. 19 (2003)                        | 100 A 27    |                | 1.000 |  | 20 M A A A | 5 S S S S S S | 3.35 (3)      |          | ·        | مست از      | 1            | 11111111111 | しょうしん くんしん しょうしん ていたい アンパンパー |

| ALS  |                             |                      |                    |                     | PC                  | KC  |        |
|--|-----------------------------|----------------------|--------------------|---------------------|---------------------|---|--------|
| (  | Cooler l                    | Receipt and Pr       | eservation Fo      | rm                  |                     | ~ <del>_</del>  |        |
| Client TRANSALTA   |                             |                      | Service Reques     | t <b>K18</b> 0909   | 5                   |   |        |
| Client <u>TRAUSALTA</u><br>Received: <u>5-31-18</u> Open   | ned: <u>5-3/-</u> /         | / <u>8</u> By:       | <u>]5/</u> Unl     | oaded: <u>5-31</u>  | <u>- 8</u> By:      | ASP   | _      |
| 1. Samples were received via? US   |                             | UPS DI               |                    | Courier> Hand       |                     |   |        |
| <ol> <li>Samples were received in: (circle)</li> </ol>   | Cooler                      | Box Enve             |                    |                     |                     | NA  |        |
| 3. Were <u>custody seals</u> on coolers?   | NA (Y                       |                      | yes, how many a    | nd where?           | 1 TON FRO           |   |        |
| If present, were custody seals intac   | t? (Y                       |                      |                    | they signed and d   |                     | Y   | N      |
| Raw Corrected, Raw Con   | rected Corr.                | Thermometer          | Cooler/COC ID      |                     | racking Number      |   |        |
|  | $\frac{p Blank}{2} + O_{i}$ | 1D<br>356            | N<br>80819         |                     | ·                   |   | Filed  |
|  |                             |                      |                    |                     |                     |   |        |
|  |                             | <u> </u>             |                    |                     |                     |   |        |
|  |                             | ++                   |                    |                     |                     |   | +      |
| 4. Packing material: Inserts Baggies Bubble Wrap Gel Packs. Wet Ice Dry Ice Sleeves                  |                             |                      |                    |                     |                     |   |        |
| <b>e</b>   |                             |                      |                    |                     |                     |   |        |
| 6. Were samples received in good co  | ondition (tempera           | ature, unbroken)?    | Indicate in the to | able below.         | NA                  | $\widetilde{(4)}$   | N      |
|  | •                           | les were received:   | Frozen Pa          | artially Thawed     | <i>Thawed</i><br>NA | $\widehat{\mathcal{Q}}$   | N      |
| <ol> <li>Were all sample labels complete (</li> <li>8. Did all sample labels and tags agr</li> </ol> |                             |                      | naior discrananci  | ies in the table on |                     | Ì   | N<br>N |
| <ol> <li>Were appropriate bottles/containe</li> </ol>  |                             | -                    |                    | es in me tuble on   | NA                  | - OF  | N      |
| 10. Were the pH-preserved bottles (.   |                             |                      |                    | Indicate in the tab |                     | $(\hat{\mathbf{Y}})$  | N      |
| 11. Were VOA vials received witho  | ut headspace? In            | ndicate in the table | e below.           |                     | NA                  | and the second se | N      |
| 12. Was C12/Res negative?  |                             |                      |                    |                     | NA                  | Y Y   | Ν      |
|  |                             | ··                   |                    | <del>,</del>        | ·                   |   |        |
| Sample ID on Bottle  | ······                      | Sample ID on CC      | <u>)</u> C         |                     | Identified by:      |   |        |
|  |                             |                      |                    |                     |                     |   | {      |
|  |                             |                      |                    |                     |                     |   |        |
|  | Bottle Count                | Out of Head-         |                    | Volume              | Reagent Lot         |   | 1      |
| Sample ID  | Bottle Type                 | Temp space Br        | oke pH Rea         | agent added         | Number              | Initials  | Time   |
|  |                             | ++                   |                    |                     |                     |   |        |

Notes, Discrepancies, & Resolutions:

|  |                           |  | <br>A CONTRACT |         |
|--|---------------------------|--|----------------|---------|
|  |                           |  | C. Carpon      |         |
|  | har an fight and a second |  | See. H         | <u></u> |

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## **Miscellaneous Forms**

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#### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

#### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- $i \,$   $\,$  The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
   DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### Additional Petroleum Hydrocarbon Specific Qualifiers

- ${f F}$  The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

## ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso State Certifications, Accreditations, and Licenses

| Agency                   | Web Site   | Number      |
|--------------------------|--|-------------|
| Alaska DEH               | http://dec.alaska.gov/eh/lab/cs/csapproval.htm   | UST-040     |
| Arizona DHS              | http://www.azdhs.gov/lab/license/env.htm   | AZ0339      |
| Arkansas - DEQ           | http://www.adeq.state.ar.us/techsvs/labcert.htm  | 88-0637     |
| California DHS (ELAP)    | http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx  | 2795        |
| DOD ELAP                 | http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm   | L16-58-R4   |
| Florida DOH              | http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm  | E87412      |
| Hawaii DOH               | http://health.hawaii.gov/  | -           |
| ISO 17025                | http://www.pjlabs.com/   | L16-57      |
| Louisiana DEQ            | http://www.deq.louisiana.gov/page/la-lab-accreditation   | 03016       |
| Maine DHS                | http://www.maine.gov/dhhs/   | WA01276     |
| Minnesota DOH            | http://www.health.state.mn.us/accreditation  | 053-999-457 |
| Nevada DEP               | http://ndep.nv.gov/bsdw/labservice.htm   | WA01276     |
| New Jersey DEP           | http://www.nj.gov/dep/enforcement/oqa.html   | WA005       |
| New York - DOH           | https://www.wadsworth.org/regulatory/elap  | 12060       |
| North Carolina DEQ       | https://deq.nc.gov/about/divisions/water-resources/water-resources-<br>data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-<br>certification | 605         |
| Oklahoma DEQ             | http://www.deq.state.ok.us/CSDnew/labcert.htm  | 9801        |
| Oregon – DEQ (NELAP)     | http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaborator<br>yAccreditation/Pages/index.aspx   | WA100010    |
| South Carolina DHEC      | http://www.scdhec.gov/environment/EnvironmentalLabCertification/   | 61002       |
| Texas CEQ                | http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html  | T104704427  |
| Washington DOE           | http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html   | C544        |
| Wyoming (EPA Region 8)   | https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-  | -           |
| Kelso Laboratory Website | www.alsglobal.com<br>to our laboratory's NFLAP-approved quality assurance program A complete   | NA          |

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

## Acronyms

| ASTM       | American Society for Testing and Materials  |
|------------|---|
| A2LA       | American Association for Laboratory Accreditation   |
| CARB       | California Air Resources Board  |
| CAS Number | Chemical Abstract Service registry Number   |
| CFC        | Chlorofluorocarbon  |
| CFU        | Colony-Forming Unit   |
| DEC        | Department of Environmental Conservation  |
| DEQ        | Department of Environmental Quality   |
| DHS        | Department of Health Services   |
| DOE        | Department of Ecology   |
| DOH        | Department of Health  |
| EPA        | U. S. Environmental Protection Agency   |
| ELAP       | Environmental Laboratory Accreditation Program  |
| GC         | Gas Chromatography  |
| GC/MS      | Gas Chromatography/Mass Spectrometry  |
| LOD        | Limit of Detection  |
| LOQ        | Limit of Quantitation   |
| LUFT       | Leaking Underground Fuel Tank   |
| M<br>MCL   | Modified<br>Maximum Contaminant Level is the highest permissible concentration of a substance<br>allowed in drinking water as established by the USEPA. |
| MDL        | Method Detection Limit  |
| MPN        | Most Probable Number  |
| MRL        | Method Reporting Limit  |
| NA         | Not Applicable  |
| NC         | Not Calculated  |
| NCASI      | National Council of the Paper Industry for Air and Stream Improvement   |
| ND         | Not Detected  |
| NIOSH      | National Institute for Occupational Safety and Health   |
| PQL        | Practical Quantitation Limit  |
| RCRA       | Resource Conservation and Recovery Act  |
| SIM        | Selected Ion Monitoring   |
| TPH        | Total Petroleum Hydrocarbons  |
| tr         | Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.  |

Analyst Summary report

#### **Client:** Transalta Centralia Mining, LLC **Project:** LPLF CCR

053018-CCR-LPLF1

K1805095-001

Ground Water

Sample Name:

Sample Matrix:

Lab Code:

### Service Request: K1805095

Date Collected: 05/30/18 **Date Received:** 05/31/18

| Analysis Method<br>6010C<br>9056A<br>SM 2540 C<br>SM 4500-H+ B<br>Sample Name: | 053018-CCR-LPLF2R            | <b>Extracted/Digested By</b><br>JHINSON | Analyzed By<br>EMCALLISTER<br>JCHAN<br>SSPAIN<br>ACHEATLEY<br>Date Collected: 05/30/18 |
|--|------------------------------|---|--|
| Lab Code:  | K1805095-002                 |   | <b>Date Received:</b> 05/31/18   |
| Sample Matrix:<br>Analysis Method  | Ground Water                 | Extracted/Digested By                   | Analyzed By  |
| 6010C<br>9056A<br>SM 2540 C<br>SM 4500-H+ B                                    |                              | JHINSON                                 | EMCALLISTER<br>JCHAN<br>SSPAIN<br>ACHEATLEY  |
| Sample Name:   | 053018-CCR-LPLF5             |   | <b>Date Collected:</b> 05/30/18  |
| Lab Code:<br>Sample Matrix:  | K1805095-003<br>Ground Water |   | <b>Date Received:</b> 05/31/18   |
| Analysis Method  |                              | Extracted/Digested By                   | Analyzed By  |
| 6010C  |                              | JHINSON                                 | EMCALLISTER  |
| 9056A<br>SM 2540 C   |                              |   | JCHAN<br>SSPAIN  |
| SM 4500-H+ B   |                              |   | ACHEATLEY  |
| Sample Name:   | 053018-CCR-LPLF7R            |   | Date Collected: 05/30/18   |
| Lab Code:  | K1805095-004                 |   | <b>Date Received:</b> 05/31/18   |
| Sample Matrix:   | Ground Water                 |   |  |
| Analysis Method  |                              | Extracted/Digested By                   | Analyzed By  |
| 6010C  |                              | JHINSON                                 | EMCALLISTER  |
| Printed 6/14/2018 5:14:1   | 5 PM                         |   | Superset Reference:18-0000467683   |

Superset Reference:18-0000467683 rev 00

Analyst Summary report

#### **Client:** Transalta Centralia Mining, LLC **Project:** LPLF CCR

053018-CCR-LPLF7R

K1805095-004

Ground Water

Sample Name:

Sample Matrix:

Sample Name:

Lab Code:

FD

K1805095-006

Lab Code:

### Service Request: K1805095

**Date Collected:** 05/30/18 **Date Received:** 05/31/18

| <b>Analysis Method</b><br>9056A<br>SM 2540 C<br>SM 4500-H+ B          |  | Extracted/Digested By                   | <b>Analyzed By</b><br>JCHAN<br>SSPAIN<br>ACHEATLEY                |
|---|--|---|---|
| Sample Name:<br>Lab Code:<br>Sample Matrix:                           | 053018-CCR-LPLF8<br>K1805095-005<br>Ground Water |   | Pate Collected: 05/30/18<br>Date Received: 05/31/18               |
| <b>Analysis Method</b><br>6010C<br>9056A<br>SM 2540 C<br>SM 4500-H+ B |  | <b>Extracted/Digested By</b><br>JHINSON | <b>Analyzed By</b><br>EMCALLISTER<br>JCHAN<br>SSPAIN<br>ACHEATLEY |

| Date Collected: | 05/30/18 |
|-----------------|----------|
| Date Received:  | 05/31/18 |

| Sample Matrix:  | Ground Water |                       |             |
|-----------------|--------------|-----------------------|-------------|
|                 |              |                       |             |
| Analysis Method |              | Extracted/Digested By | Analyzed By |
| 6010C           |              | JHINSON               | EMCALLISTER |
| 9056A           |              |                       | JCHAN       |
| SM 2540 C       |              |                       | SSPAIN      |
| SM 4500-H+ B    |              |                       | ACHEATLEY   |
|                 |              |                       |             |



# Sample Results

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

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## Metals

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

RIGHT SOLUTIONS | RIGHT PARTNER

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1805095             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 05/30/18 12:15 |
| Sample Matrix:            | Ground Water                     | Date Received: 05/31/18 13:30         |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF1<br>K1805095-001 | Basis: NA                             |

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | 0.559  | mg/L  | 0.021 | 1    | 06/04/18 11:52 | 06/01/18       |   |
| Calcium      | 6010C              | 211    | mg/L  | 0.021 | 1    | 06/04/18 11:52 | 06/01/18       |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1805095             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 05/30/18 13:40 |
| Sample Matrix:            | Ground Water                      | Date Received: 05/31/18 13:30         |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF2R<br>K1805095-002 | Basis: NA                             |

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | 0.351  | mg/L  | 0.021 | 1    | 06/04/18 11:34 | 06/01/18       |   |
| Calcium      | 6010C              | 499    | mg/L  | 0.21  | 10   | 06/04/18 11:45 | 06/01/18       |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1805095             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 05/30/18 14:20 |
| Sample Matrix:            | Ground Water                     | Date Received: 05/31/18 13:30         |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF5<br>K1805095-003 | Basis: NA                             |

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | 0.099  | mg/L  | 0.021 | 1    | 06/04/18 12:02 | 06/01/18       |   |
| Calcium      | 6010C              | 335    | mg/L  | 0.021 | 1    | 06/04/18 12:02 | 06/01/18       |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1805095             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 05/30/18 12:40 |
| Sample Matrix:            | Ground Water                      | Date Received: 05/31/18 13:30         |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF7R<br>K1805095-004 | Basis: NA                             |

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | 0.320  | mg/L  | 0.021 | 1    | 06/04/18 12:04 | 06/01/18       |   |
| Calcium      | 6010C              | 205    | mg/L  | 0.021 | 1    | 06/04/18 12:04 | 06/01/18       |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1805095             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 05/30/18 13:10 |
| Sample Matrix:            | Ground Water                     | <b>Date Received:</b> 05/31/18 13:30  |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF8<br>K1805095-005 | Basis: NA                             |

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | 0.936  | mg/L  | 0.021 | 1    | 06/04/18 12:07 | 06/01/18       |   |
| Calcium      | 6010C              | 430    | mg/L  | 0.021 | 1    | 06/04/18 12:07 | 06/01/18       |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: KI | 1805095       |
|---------------------------|---------------------------------|---------------------|---------------|
| Project:                  | LPLF CCR                        | Date Collected: 05  | 5/30/18       |
| Sample Matrix:            | Ground Water                    | Date Received: 05   | 5/31/18 13:30 |
| Sample Name:<br>Lab Code: | FD<br>K1805095-006              | Basis: NA           | Ā             |

|              | Analysis |        | 4.    |       |      |                |                | 0 |
|--------------|----------|--------|-------|-------|------|----------------|----------------|---|
| Analyte Name | Method   | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
| Boron        | 6010C    | 0.331  | mg/L  | 0.021 | 1    | 06/04/18 12:10 | 06/01/18       |   |
| Calcium      | 6010C    | 210    | mg/L  | 0.021 | 1    | 06/04/18 12:10 | 06/01/18       |   |



# **General Chemistry**

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

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Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1805095             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 05/30/18 12:15 |
| Sample Matrix:            | Ground Water                     | <b>Date Received:</b> 05/31/18 13:30  |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF1<br>K1805095-001 | Basis: NA                             |

| Analyte Name | <b>Analysis Method</b> | Result | Units    | MRL | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|----------|-----|------|----------------|---|
| Chloride     | 9056A                  | 29.1   | mg/L     | 1.0 | 10   | 06/08/18 18:10 |   |
| Fluoride     | 9056A                  | ND Ui  | mg/L     | 2.0 | 10   | 06/08/18 18:10 |   |
| pН           | SM 4500-H+ B           | 6.88   | pH Units | -   | 1    | 05/31/18 17:03 | Н |
| Sulfate      | 9056A                  | 1320   | mg/L     | 50  | 500  | 06/08/18 12:03 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1805095             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 05/30/18 12:15 |
| Sample Matrix:            | Ground Water                     | <b>Date Received:</b> 05/31/18 13:30  |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF1<br>K1805095-001 | Basis: NA                             |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 2490   | mg/L  | 5.0 | 1    | 06/01/18 13:30 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1805095             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 05/30/18 13:40 |
| Sample Matrix:            | Ground Water                      | <b>Date Received:</b> 05/31/18 13:30  |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF2R<br>K1805095-002 | Basis: NA                             |

| Analyte Name | <b>Analysis Method</b> | Result | Units    | MRL | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|----------|-----|------|----------------|---|
| Chloride     | 9056A                  | 8.3    | mg/L     | 1.0 | 10   | 06/08/18 18:20 |   |
| Fluoride     | 9056A                  | ND Ui  | mg/L     | 2.0 | 10   | 06/08/18 18:20 |   |
| pН           | SM 4500-H+ B           | 6.60   | pH Units | -   | 1    | 05/31/18 17:04 | Н |
| Sulfate      | 9056A                  | 1880   | mg/L     | 50  | 500  | 06/08/18 11:23 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1805095             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 05/30/18 13:40 |
| Sample Matrix:            | Ground Water                      | <b>Date Received:</b> 05/31/18 13:30  |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF2R<br>K1805095-002 | Basis: NA                             |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 3490   | mg/L  | 5.0 | 1    | 06/01/18 13:30 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1805095             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 05/30/18 14:20 |
| Sample Matrix:            | Ground Water                     | Date Received: 05/31/18 13:30         |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF5<br>K1805095-003 | Basis: NA                             |

| Analyte Name | <b>Analysis Method</b> | Result | Units    | MRL | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|----------|-----|------|----------------|---|
| Chloride     | 9056A                  | 3.1    | mg/L     | 1.0 | 10   | 06/08/18 18:30 |   |
| Fluoride     | 9056A                  | ND Ui  | mg/L     | 2.0 | 10   | 06/08/18 18:30 |   |
| pН           | SM 4500-H+ B           | 7.36   | pH Units | -   | 1    | 05/31/18 17:06 | Н |
| Sulfate      | 9056A                  | 665    | mg/L     | 50  | 500  | 06/08/18 12:13 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1805095             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 05/30/18 14:20 |
| Sample Matrix:            | Ground Water                     | <b>Date Received:</b> 05/31/18 13:30  |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF5<br>K1805095-003 | Basis: NA                             |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 1600   | mg/L  | 5.0 | 1    | 06/01/18 13:30 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1805095             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 05/30/18 12:40 |
| Sample Matrix:            | Ground Water                      | Date Received: 05/31/18 13:30         |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF7R<br>K1805095-004 | Basis: NA                             |

| Analyte Name | <b>Analysis Method</b> | Result | Units    | MRL | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|----------|-----|------|----------------|---|
| Chloride     | 9056A                  | 7.5    | mg/L     | 1.0 | 10   | 06/08/18 18:40 |   |
| Fluoride     | 9056A                  | ND Ui  | mg/L     | 2.0 | 10   | 06/08/18 18:40 |   |
| pН           | SM 4500-H+ B           | 6.57   | pH Units | -   | 1    | 05/31/18 17:08 | Н |
| Sulfate      | 9056A                  | 1510   | mg/L     | 1.0 | 10   | 06/08/18 18:40 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1805095             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 05/30/18 12:40 |
| Sample Matrix:            | Ground Water                      | Date Received: 05/31/18 13:30         |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF7R<br>K1805095-004 | Basis: NA                             |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 2260   | mg/L  | 5.0 | 1    | 06/01/18 13:30 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1805095             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 05/30/18 13:10 |
| Sample Matrix:            | Ground Water                     | <b>Date Received:</b> 05/31/18 13:30  |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF8<br>K1805095-005 | Basis: NA                             |

| Analyte Name | <b>Analysis Method</b> | Result | Units    | MRL | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|----------|-----|------|----------------|---|
| Chloride     | 9056A                  | 7.2    | mg/L     | 1.0 | 10   | 06/08/18 18:50 |   |
| Fluoride     | 9056A                  | ND Ui  | mg/L     | 2.0 | 10   | 06/08/18 18:50 |   |
| pН           | SM 4500-H+ B           | 6.15   | pH Units | -   | 1    | 05/31/18 17:10 | Н |
| Sulfate      | 9056A                  | 3670   | mg/L     | 1.0 | 10   | 06/08/18 18:50 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1805095             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 05/30/18 13:10 |
| Sample Matrix:            | Ground Water                     | <b>Date Received:</b> 05/31/18 13:30  |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF8<br>K1805095-005 | Basis: NA                             |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 3540   | mg/L  | 5.0 | 1    | 06/01/18 13:30 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K1805095            |
|---------------------------|---------------------------------|--------------------------------------|
| Project:                  | LPLF CCR                        | Date Collected: 05/30/18             |
| Sample Matrix:            | Ground Water                    | <b>Date Received:</b> 05/31/18 13:30 |
| Sample Name:<br>Lab Code: | FD<br>K1805095-006              | Basis: NA                            |

| Analyte Name | Analysis Method | Result | Units    | MRL | Dil. | Date Analyzed  | Q |
|--------------|-----------------|--------|----------|-----|------|----------------|---|
| Chloride     | 9056A           | 8.1    | mg/L     | 1.0 | 10   | 06/08/18 19:00 |   |
| Fluoride     | 9056A           | ND Ui  | mg/L     | 2.0 | 10   | 06/08/18 19:00 |   |
| pН           | SM 4500-H+ B    | 6.47   | pH Units | -   | 1    | 05/31/18 17:12 |   |
| Sulfate      | 9056A           | 1660   | mg/L     | 1.0 | 10   | 06/08/18 19:00 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: | K1805095       |
|---------------------------|---------------------------------|------------------|----------------|
| Project:                  | LPLF CCR                        | Date Collected:  | 05/30/18       |
| Sample Matrix:            | Ground Water                    | Date Received:   | 05/31/18 13:30 |
| Sample Name:<br>Lab Code: | FD<br>K1805095-006              | Basis:           | NA             |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 2320   | mg/L  | 5.0 | 1    | 06/01/18 13:30 |   |



# QC Summary Forms

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com



## Metals

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K1805095 |
|---------------------------|---------------------------------|---------------------------|
| Project:                  | LPLF CCR                        | Date Collected: NA        |
| Sample Matrix:            | Ground Water                    | Date Received: NA         |
| Sample Name:<br>Lab Code: | Method Blank<br>KQ1807298-02    | Basis: NA                 |

**Total Metals** 

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | ND U   | mg/L  | 0.021 | 1    | 06/04/18 11:30 | 06/01/18       |   |
| Calcium      | 6010C              | ND U   | mg/L  | 0.021 | 1    | 06/04/18 11:30 | 06/01/18       |   |

QA/QC Report

| Client:              | Transalta Centralia Mining, LI | LC           | Service      | Request:  | K1805095     |  |  |  |  |  |
|----------------------|--------------------------------|--------------|--------------|-----------|--------------|--|--|--|--|--|
| Project:             | LPLF CCR                       |              | Date Co      | ollected: | 05/30/18     |  |  |  |  |  |
| Sample Matrix:       | Ground Water                   |              | Date R       | eceived:  | 05/31/18     |  |  |  |  |  |
|                      |                                |              | Date A       | nalyzed:  | 06/4/18      |  |  |  |  |  |
|                      |                                |              | Date Ex      | xtracted: | 06/1/18      |  |  |  |  |  |
| Matrix Spike Summary |                                |              |              |           |              |  |  |  |  |  |
|                      |                                | Total Metals | •            |           |              |  |  |  |  |  |
| Sample Name:         | 053018-CCR-LPLF2R              |              |              | Units:    | mg/L         |  |  |  |  |  |
| Lab Code:            | K1805095-002                   |              |              | Basis:    | NA           |  |  |  |  |  |
| Analysis Method:     | 6010C                          |              |              |           |              |  |  |  |  |  |
| Prep Method:         | EPA CLP-METALS ILM04.0         |              |              |           |              |  |  |  |  |  |
|                      |                                | Matrix Spike |              |           |              |  |  |  |  |  |
|                      |                                | KQ1807298-04 |              |           |              |  |  |  |  |  |
| Analyte Name         | Sample Result                  | Result       | Spike Amount | % Rec     | % Rec Limits |  |  |  |  |  |

0.762

496

0.500

10.0

82

-33 #

75-125

75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

0.351

499

Boron

Calcium

QA/QC Report

| Client:                  | Transalta Centralia M | Mining, LLC |         |                  | Service F | Request:      | K18050  | 095              |  |  |
|--------------------------|-----------------------|-------------|---------|------------------|-----------|---------------|---------|------------------|--|--|
| Project                  | LPLF CCR              |             |         |                  | Date Co   | ollected:     | 05/30/1 | 8                |  |  |
| Sample Matrix:           | Ground Water          |             |         |                  | Date R    | eceived:      | 05/31/1 | 8                |  |  |
|                          |                       |             |         |                  | Date Ar   | nalyzed:      | 06/04/1 | 8                |  |  |
| Replicate Sample Summary |                       |             |         |                  |           |               |         |                  |  |  |
|                          |                       |             | Total M | Ietals           |           |               |         |                  |  |  |
| Sample Name:             | 053018-CCR-LPLF       | 2R          |         |                  |           | Units:        | mg/L    |                  |  |  |
| Lab Code:                | K1805095-002          |             |         |                  |           | <b>Basis:</b> | NA      |                  |  |  |
|                          |                       |             |         | Duplicate Sample |           |               |         |                  |  |  |
|                          | Analysis              |             | Sample  | KQ1807298-03     |           |               |         |                  |  |  |
| Analyte Name             | Method                | MRL         | Result  | Result           | Average   | RP            | Ď       | <b>RPD Limit</b> |  |  |
| Boron                    | 6010C                 | 0.021       | 0.351   | 0.340            | 0.346     | 3             |         | 20               |  |  |

499

484

492

3

20

0.21

6010C

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Calcium

QA/QC Report

Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Ground Water

## Service Request: K1805095 Date Analyzed: 06/04/18

## Lab Control Sample Summary Total Metals

Units:mg/L Basis:NA

## Lab Control Sample

KQ1807298-01

| Analyte Name | <b>Analytical Method</b> | Result | Spike Amount | % Rec | % Rec Limits |
|--------------|--------------------------|--------|--------------|-------|--------------|
| Boron        | 6010C                    | 0.474  | 0.500        | 95    | 80-120       |
| Calcium      | 6010C                    | 12.9   | 12.5         | 103   | 80-120       |



# **General Chemistry**

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: | K1805095 |
|---------------------------|---------------------------------|------------------|----------|
| Project:                  | LPLF CCR                        | Date Collected:  | NA       |
| Sample Matrix:            | Ground Water                    | Date Received:   | NA       |
| Sample Name:<br>Lab Code: | Method Blank<br>K1805095-MB1    | Basis:           | NA       |

| Analyte Name | <b>Analysis Method</b> | Result | Units | MRL  | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|-------|------|------|----------------|---|
| Chloride     | 9056A                  | ND U   | mg/L  | 0.10 | 1    | 06/08/18 10:53 |   |
| Fluoride     | 9056A                  | ND U   | mg/L  | 0.20 | 1    | 06/08/18 10:53 |   |
| Sulfate      | 9056A                  | ND U   | mg/L  | 0.10 | 1    | 06/08/18 10:53 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K1805095 |
|---------------------------|---------------------------------|---------------------------|
| Project:                  | LPLF CCR                        | Date Collected: NA        |
| Sample Matrix:            | Ground Water                    | Date Received: NA         |
| Sample Name:<br>Lab Code: | Method Blank<br>K1805095-MB1    | Basis: NA                 |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | ND U   | mg/L  | 5.0 | 1    | 06/01/18 13:30 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K | (1805095 |
|---------------------------|---------------------------------|--------------------|----------|
| Project:                  | LPLF CCR                        | Date Collected: N  | JA       |
| Sample Matrix:            | Ground Water                    | Date Received: N   | JА       |
| Sample Name:<br>Lab Code: | Method Blank<br>K1805095-MB2    | Basis: N           | ĮΑ       |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | ND U   | mg/L  | 5.0 | 1    | 06/01/18 13:30 |   |

QA/QC Report

| Client:<br>Project:<br>Sample Matrix: | Transalta Cer<br>LPLF CCR<br>Ground Wate |         | g, LLC |                           |        | Dat<br>Dat              | vice Reque<br>e Collected<br>e Received<br>e Analyzed | l: 05/<br>: 05/ | 805095<br>/30/18<br>/31/18<br>/8/18 |       |
|---------------------------------------|--|---------|--------|---------------------------|--------|-------------------------|---|-----------------|-------------------------------------|-------|
|                                       |  |         |        |                           |        | Dat                     | e Extracte  | d: NA           | 4                                   |       |
| Duplicate Matrix Spike Summary        |  |         |        |                           |        |                         |   |                 |                                     |       |
|                                       |  |         | -      | Sulfat                    | -      | ·                       |   |                 |                                     |       |
| Sample Name:                          | 053018-CCR                               | -LPLF2R |        |                           |        |                         | Unit  | s: mg           | g/L                                 |       |
| Lab Code:                             | K1805095-00                              | 02      |        |                           |        |                         | Basi  | s: NA           | Δ                                   |       |
| Analysis Method:                      | 9056A                                    |         |        |                           |        |                         |   |                 |                                     |       |
| Prep Method:                          | None                                     |         |        |                           |        |                         |   |                 |                                     |       |
|                                       |  |         |        | <b>x Spike</b><br>5-002MS |        | Duplicate M<br>K1805095 | -   | e               |                                     |       |
|                                       | Sample                                   |         | Spike  |                           |        | Spike                   |   | % Rec           |                                     | RPD   |
| Analyte Name                          | Result                                   | Result  | Amount | % Rec                     | Result | Amount                  | % Rec   | Limits          | RPD                                 | Limit |
| Sulfate                               | 1880                                     | 3990    | 2000   | 106                       | 3770   | 2000                    | 95  | 90-110          | 6                                   | 20    |

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

|                          |                             |         | QA/QC Report  |  |              |             |                  |  |  |
|--------------------------|-----------------------------|---------|---------------|--|--------------|-------------|------------------|--|--|
| Client:                  | Transalta Centralia Mining, | LLC     |               |  | Service Requ | est: K1805  | 5095             |  |  |
| Project                  | LPLF CCR                    |         |               |  | Date Collec  | ted: 05/30/ | /18              |  |  |
| Sample Matrix:           | Ground Water                |         |               |  | Date Receiv  | ved: 05/31/ | /18              |  |  |
|                          |                             |         |               |  | Date Analyz  | zed: 05/31/ | /18              |  |  |
| Replicate Sample Summary |                             |         |               |  |              |             |                  |  |  |
|                          |                             | General | Chemistry Par | ameters                                    |              |             |                  |  |  |
| Sample Name:             | 053018-CCR-LPLF2R           |         |               |  | U            | nits: pH U  | nits             |  |  |
| Lab Code:                | K1805095-002                |         |               |  | В            | asis: NA    |                  |  |  |
|                          |                             |         | Sample        | Duplicate<br>Sample<br>K1805095-<br>002DUP |              |             |                  |  |  |
| Analyte Name             | Analysis Method             | MRL     | Result        | Result                                     | Average      | RPD         | <b>RPD</b> Limit |  |  |
| pH                       | SM 4500-H+ B                | -       | 6.60          | 6.74                                       | 6.67         | 2           | 20               |  |  |

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

| Client:<br>Project<br>Sample Matrix: | Transalta Centralia Mining,<br>LPLF CCR<br>Ground Water | LLC |                  |                                  | Service Request:<br>Date Collected:<br>Date Received: | 05/30/1 | 8                |  |
|--------------------------------------|---|-----|------------------|----------------------------------|---|---------|------------------|--|
|                                      |   |     |                  |                                  | Date Analyzed:  | 06/01/1 | 8 - 06/08/18     |  |
| Replicate Sample Summary             |   |     |                  |                                  |   |         |                  |  |
| General Chemistry Parameters         |   |     |                  |                                  |   |         |                  |  |
| Sample Name:                         | 053018-CCR-LPLF2R                                       |     |                  |                                  | Units   | : mg/L  |                  |  |
| Lab Code:                            | K1805095-002  |     |                  |                                  | Basis   | : NA    |                  |  |
|                                      |   |     |                  | Duplicate<br>Sample<br>K1805095- |   |         |                  |  |
| Analyte Name                         | Analysis Method   | MRL | Sample<br>Result | 002DUP<br>Result                 | Average   | RPD     | <b>RPD</b> Limit |  |
| Solids, Total Dissolved              |   | 5.0 | 3490             | 3450                             | 3470  | 1       | 5                |  |
| Sulfate                              | 9056A   | 50  | 1880             | 1780                             | 1830  | 5       | 20               |  |

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Ground Water

## Service Request: K1805095 Date Analyzed: 06/01/18 - 06/08/18

## Lab Control Sample Summary General Chemistry Parameters

Units:mg/L Basis:NA

## Lab Control Sample K1805095-LCS

| Analyte Name            | <b>Analytical Method</b> | Result | Spike Amount | % Rec | % Rec Limits |
|-------------------------|--------------------------|--------|--------------|-------|--------------|
| Chloride                | 9056A                    | 5.18   | 5.00         | 104   | 80-120       |
| Fluoride                | 9056A                    | 5.33   | 5.00         | 107   | 90-110       |
| Solids, Total Dissolved | SM 2540 C                | 484    | 523          | 93    | 85-115       |
| Sulfate                 | 9056A                    | 5.23   | 5.00         | 105   | 90-110       |

QA/QC Report

Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Ground Water

**Service Request:** K1805095 **Date Analyzed:** 05/31/18

## Lab Control Sample Summary General Chemistry Parameters

Units:pH Units Basis:NA

Lab Control Sample K1805095-LCS

| Analyte Name | Analytical Method | Result | Spike Amount | % Rec | % Rec Limits |
|--------------|-------------------|--------|--------------|-------|--------------|
| pH           | SM 4500-H+ B      | 8.40   | 8.41         | 100   | 85-115       |



Dennis Morr Transalta Centralia Mining, LLC 913 Big Hanaford Rd Centralia, WA 98531

## Laboratory Results for: LPLF CCR

Dear Dennis,

Enclosed are the results of the sample(s) submitted to our laboratory August 09, 2018 For your reference, these analyses have been assigned our service request number **K1807488**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3356. You may also contact me via email at Kurt.Clarkson@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kunt Clauson

Kurt Clarkson Sr. Project Manager

> ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626 PHONE +1 360 577 7222 | FAX +1 360 636 1068 ALS Group USA, Corp. dba ALS Environmental



## Narrative Documents

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com



Client:Transalta Centralia Mining, LLCProject:LPLF CCR

Service Request: K1807488 Date Received: 08/09/2018

### **CASE NARRATIVE**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS).

#### Sample Receipt:

Sample Matrix: Water

Two water samples were received for analysis at ALS Environmental on 08/09/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### <u>Metals:</u>

No significant anomalies were noted with this analysis.

#### General Chemistry:

No significant anomalies were noted with this analysis.

Runt Clauson

Approved by

Date 08/24/2018



## SAMPLE DETECTION SUMMARY

| CLIENT ID: 080918-CCR-LPLF2R |         |      |           |          |       |           |
|------------------------------|---------|------|-----------|----------|-------|-----------|
| Analyte                      | Results | Flag | MDL       | MRL      | Units | Method    |
| Solids, Total Dissolved      | 3480    |      |           | 5.0      | mg/L  | SM 2540 C |
| Boron                        | 0.325   |      |           | 0.021    | mg/L  | 6010C     |
| Calcium                      | 463     |      |           | 0.021    | mg/L  | 6010C     |
| CLIENT ID: 080918-CCR-LPLF8  |         | Lab  | DID: K180 | 7488-002 |       |           |
| Analyte                      | Results | Flag | MDL       | MRL      | Units | Method    |
| Sulfate                      | 2520    |      |           | 100      | mg/L  | 9056A     |



# Sample Receipt Information

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

## SAMPLE CROSS-REFERENCE

| SAMPLE #     | CLIENT SAMPLE ID  | DATE     | TIME |
|--------------|-------------------|----------|------|
| K1807488-001 | 080918-CCR-LPLF2R | 8/9/2018 | 0845 |
| K1807488-002 | 080918-CCR-LPLF8  | 8/9/2018 | 0920 |



ADDRESS 1317 South 13th Ave., Kelso, WA 98626 PHONE 1 360 577 7222 FAX 1 360 636 1068

K1807488

Work Order No.: 80819

Chain of Custody

Part of the ALS Group A Campbell Brothers Limited Company

| Project Manager:                              | t Manager: Bill Scheer |            |                   |                 |               |       |              |                 |                | j               | Bill to: ANALASA |                                       |           |              | Bill Scheer           |                            |                 |            |                         |     |                 |               |                   |                          |
|---|------------------------|------------|-------------------|-----------------|---------------|-------|--------------|-----------------|----------------|-----------------|------------------|---------------------------------------|-----------|--------------|-----------------------|----------------------------|-----------------|------------|-------------------------|-----|-----------------|---------------|-------------------|--------------------------|
| Client Name:                                  | TransAlta              | Centralia  | Mining Com        | pany            |               |       |              |                 |                |                 |                  | Cor                                   | npan      | <b>iy:</b> ि |                       | TransAlta Centralia Mining |                 |            |                         |     |                 |               |                   |                          |
| Address:                                      | 913 Big H              | lanaford F | Road              |                 |               |       |              |                 |                |                 |                  |                                       |           |              | 913 Big Hanaford Road |                            |                 |            |                         |     |                 |               |                   |                          |
| City, State ZIP:                              | Centralia,             | WA 9853    | 31                |                 |               |       |              |                 |                |                 |                  | City, State ZIP:                      |           |              | Centralia, WA 98531   |                            |                 |            |                         |     |                 |               |                   |                          |
| Email: Mathematica                            | bill_schee             |            | ilta.com          |                 | Phone:        | 36    | 0-330        | 30-2332         |                |                 | Em               |                                       |           | <u>Neter</u> |                       |                            | er@tra          | insalta    | a.com                   |     | po#             | Ł             |                   |                          |
| Project Name:                                 | LPLF CCI               | ٦          |                   |                 |               |       | Valeven.     | 5 5 4 5 4       | - 277          | eneve<br>L      | 1999             | y cjesky                              | RE        | QUE          | STE                   | D AN                       | ALY             | SIS        | 승규는                     |     |                 |               | · · · · · · · · · | TAT                      |
| Project Number:                               |                        |            |                   |                 |               |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            |                         |     |                 |               |                   | Routine 21day            |
| P.O. Number:                                  | 4700075                | 456 Line   | 90                |                 |               |       |              |                 |                |                 | [                | l                                     |           | Į            |                       |                            |                 | 1          | Same Day 100%           |     |                 |               |                   |                          |
| Sampler's Name:                               | Bill Schee             | er         |                   | _               |               |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            | Next Day ***            |     |                 |               |                   |                          |
| ahten die | SA                     | MPLE RI    | ECEIPT            |                 |               |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            |                         |     |                 |               |                   | 3 Day                    |
| Temperature (°C):                             |                        |            | Temp Bla          | nk Present      | N             |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            |                         |     |                 |               | 5 Day 50%         |                          |
| Received Intact:                              |                        |            |                   |                 |               | ]     |              |                 |                |                 |                  |                                       | [         |              |                       |                            |                 |            |                         |     |                 | Surcharges.   |                   |                          |
| Cooler Custody Seals: Yes No N/A Total Contai |                        | tainers:   |                   |                 |               |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            |                         |     | Please call for |               |                   |                          |
| Sample Custody Seals: 2003/20 Yes No N/A      |                        |            |                   | ers             |               | Hd    | 228          | 877             |                | le              |                  |                                       |           | ∣⊢           | 226                   |                            |                 |            |                         |     |                 | availability  |                   |                          |
| Sample Identific                              | ation                  | Matrix     | Date<br>Sampled   | Time<br>Sampled | Lab ID        | 6     | of Cont      | SM 4500-H + B / | 904.0 / Radium | SM 2540 C / TDS | 7470A / Hg T     | 9056A / Chloride                      | 9056A / F | 9056A / SO4  | 6010C / Metals        | 6020A / Metals             | 903.0 Radium 22 |            |                         |     |                 |               |                   | Due Date:                |
| 080918-CCR-LPI                                | 6566307.6565<br>E2D    | GW         | 08/09/2018        | 8:45            | a - NNAN GARG | 2     | n a la terre | l ∞             | 6              | X               | I N              | <u>ő</u>                              | ð         | 6            | ق<br>X                | ق<br>X                     | 6               |            |                         |     |                 |               |                   | Comments and             |
| 080918-CCR-LP                                 |                        | GW         | 08/09/2018        | 9:20            |               | 1     |              |                 |                | <u> </u> ^−     | <u> </u>         | · · · · · · · · · · · · · · · · · · · |           | x            | <u> </u>              | ~                          |                 |            |                         | -   |                 |               |                   | Boron and Calcium needed |
|   |                        | 000        | 08/08/2010        | 3.20            |               |       |              |                 |                | <u> </u>        |                  |                                       |           | ^            |                       |                            |                 |            |                         | +   |                 |               |                   | Sulfate                  |
|   |                        |            |                   |                 |               |       |              |                 | <br>           | ╂               |                  |                                       | <b> </b>  |              |                       |                            |                 | <u>_</u> _ |                         |     |                 |               |                   |                          |
|   |                        |            |                   |                 |               |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            | _                       |     |                 |               |                   |                          |
|   |                        | *****      |                   |                 |               |       |              |                 |                | <u> </u>        |                  |                                       |           |              |                       |                            |                 |            |                         |     |                 |               |                   |                          |
|   |                        |            |                   |                 |               |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            |                         |     |                 |               |                   |                          |
|   |                        |            |                   |                 |               |       |              |                 |                |                 | <u> </u>         |                                       |           |              |                       |                            |                 |            |                         |     | ļ               |               |                   |                          |
|   |                        |            |                   |                 |               |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            |                         |     |                 |               | <u> </u>          |                          |
|   |                        |            |                   |                 |               |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            |                         |     |                 |               |                   |                          |
|   |                        |            |                   |                 |               |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            | _                       |     |                 |               |                   |                          |
|   | <u> </u>               |            |                   |                 |               |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            |                         |     |                 |               |                   |                          |
| Dissolved                                     |                        | A          | g, Al, As, B, B   | a, Be, Ca, Cd   | , Co, Cr, (   | Cu, F | e, K,        | Li, M           | lg, Mi         | n, <b>Mc</b>    | ), Na,           | Ni, I                                 | P, Pb,    | Sb, :        | Se, Si                | , Sn,                      | Sr, T           | l, V, Zr   | , Zr                    |     |                 | Addit         | a sa sa tala      | l Methods Available      |
| Total   |                        |            | g, Al, As, B, B   |                 | , Co, Cr, (   | Cu, F | e, K,        | Li, M           | <u>g, M</u>    | n, Mo           | ), Na,           | Ni, I                                 | P, Pb,    | Sb,          | Se, Si                | , Sn,                      | Sr, T           |            |                         |     |                 |               | Ur                | oon Request              |
|   |                        | RE         | LINQŲIȘH          | Ę⁄D BY          |               |       |              |                 |                |                 |                  | Nabi                                  |           |              |                       |                            |                 | R          | <u>C</u> EI             | VED | BY              | <u>ana an</u> | 2833              |                          |
| Print N                                       | ame                    | 2022년 중    | 1/1/ Sy           | nature          |               |       | Dat          | te/Ti           | me             |                 |                  | $\int $                               | PI        | int l        | Nam                   | e                          |                 |            | $\mathcal{N}$           | Sig | natu            | re            | : (신라)            | Date/Time                |
| William S                                     | Scheer                 |            | MAA               |                 |               | 08/   | 09/2         | 2018            |                |                 | 4                | $\langle \Lambda \rangle$             | Ma        | W            | 3h                    | )                          |                 | 4          | $\overline{\mathbf{V}}$ | M   |                 | AIS           | <u> </u>          | Shire 14m                |
|   |                        |            | <b>v v v</b> () + |                 | <u> </u>      |       |              |                 |                |                 |                  |                                       |           |              |                       |                            |                 |            | 9                       |     |                 | 1.00          | , <del>,</del>    |                          |

|   |                                   |                                |                 |                                       |  | PC K     | ~                                      |
|---|-----------------------------------|--------------------------------|-----------------|---------------------------------------|--|----------|--|
|   | Cooler                            | Receipt and l                  | Preservation    | Form                                  | <i></i>  |          | ************************************** |
| Tranchila   |                                   |                                |                 | uest <b>K18</b>                       | 7488   | . /      |  |
| Client <u>[ Mans Afta</u>   | olali                             | 0/ D                           | - ( / .         | Unloaded:                             | 9//8 BV:   | 1        |  |
| Received: 8 9 00 Ope  | ened:_ <u>\${</u> 4][             | <b>§</b> By:                   | qq-             | Unioaded: V                           | Щ_оВу.   | R        |  |
| I. Samples were received via? U   | SPS Fed Ex                        | UPS L                          | OHL PDX         | (Courier) H                           | land Delivered   |          |  |
| 2. Samples were received in: (circle)   | ) (Cooler)                        | Box Env                        | velope Ot       | her                                   | £  | NA       |  |
| 3. Were <u>custody seals</u> on coolers?  | NA (                              | Y N I                          | lf yes, how mar |                                       | 1 Front  | <u>,</u> | <del>~~~</del>                         |
| If present, were custody seals inta   | act?                              | N N                            | If present, w   | ere they signed a                     |  | Y        | N                                      |
|   | orrected Corr.<br>mp Blank Factor | Thermometer<br>ID              | Cooler/COC      | NA                                    | Tracking Numb  |          | AFiled                                 |
|   | MA -12.1                          | 352                            |                 |                                       | • <del>_****_****</del> *** <u>***</u> ** <u>***</u> ** <u>***</u> ** <u>**</u> ** |          |  |
|   |                                   |                                |                 |                                       |  |          |  |
|   |                                   |                                |                 |                                       |  |          |  |
|   |                                   |                                | <br>            | ·                                     |  |          |  |
|   |                                   |                                |                 |                                       |  |          |  |
| 4. Packing material: Inserts Bay  |                                   |                                | Wet Ice D       | ry Ice Sleeves                        |  | . Gon    | <br>N                                  |
| <ol> <li>Were custody papers properly fil</li> <li>Were samples received in good c</li> </ol> | · · -                             |                                | Indicate in th  | a tabla balovo                        | N.<br>N.   | $\sim$   | N                                      |
|   | able, tissue sample               | -                              |                 | e fable below.<br>Partially Thawe     |  |          |  |
| 7. Were all sample labels complete  | (i.e analysis, pres               | ervation, etc.)?               |                 | ·                                     | N  | A 🕥      | Ν                                      |
| 8. Did all sample labels and tags age   | ree with custody p                | papers? Indicate               | major discrepa  | ncies in the table                    | on page 2. N   | $\smile$ | N                                      |
| 9. Were appropriate bottles/contain   | ters and volumes                  | received for the te            | ests indicated? |                                       | N  |          | Ν                                      |
| 10. Were the pH-preserved bottles (   |                                   |                                |                 | ? Indicate in the                     | table below N  | $\sim$ – | N                                      |
| 11. Were VOA vials received with  | out headspace? In                 | dicate in the tabl             | e below.        |                                       | <u>N</u>   | A Y      | N                                      |
| 12. Was C12/Res negative?   |                                   |                                | ····            | · · · · · · · · · · · · · · · · · · · |  | Y Y      | N                                      |
| Sample ID on Bottle   |                                   | Sample ID on CC                |                 |                                       | Identified by:   |          |  |
| Sample ID on Bottle   |                                   | Sample to on cc                |                 | +                                     | Identified by:   |          |  |
| }   |                                   |                                |                 | 1                                     |  | <u> </u> | {                                      |
|   |                                   |                                |                 |                                       |  |          |  |
|   |                                   |                                |                 | 1                                     |  | 1        | 1                                      |
| Sample ID   | Bottle Count<br>Bottle Type       | Out of Head-<br>Temp space Bro | oke pH R        | Volum<br>eagent adde                  |  | Initials | Time                                   |

| Sample ID                      | Bottle Type | Temp | space | Broke | pm | rteagent | audeo | Number | Initials | lime |
|--------------------------------|-------------|------|-------|-------|----|----------|-------|--------|----------|------|
|                                |             |      |       |       |    |          |       |        |          |      |
|                                |             |      | 1     |       |    |          |       |        |          | ,    |
|                                |             | 1    | 1     |       |    |          |       |        |          |      |
|                                |             | 1    | 1     |       |    |          |       |        |          |      |
|                                |             |      | 1     |       | [  |          |       |        | 1        |      |
|                                |             |      |       |       |    |          |       |        | 1        |      |
| Notes, Discrepancies, & Resolu | utions:     |      |       |       |    |          |       |        |          |      |

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## Miscellaneous Forms

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#### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

#### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- $i \,$   $\,$  The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
   DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### Additional Petroleum Hydrocarbon Specific Qualifiers

- ${f F}$  The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

## ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso State Certifications, Accreditations, and Licenses

| Agency                   | Web Site   | Number      |
|--------------------------|--|-------------|
| Alaska DEH               | http://dec.alaska.gov/eh/lab/cs/csapproval.htm   | UST-040     |
| Arizona DHS              | http://www.azdhs.gov/lab/license/env.htm   | AZ0339      |
| Arkansas - DEQ           | http://www.adeq.state.ar.us/techsvs/labcert.htm  | 88-0637     |
| California DHS (ELAP)    | http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx  | 2795        |
| DOD ELAP                 | http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm   | L16-58-R4   |
| Florida DOH              | http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm  | E87412      |
| Hawaii DOH               | http://health.hawaii.gov/  | -           |
| ISO 17025                | http://www.pjlabs.com/   | L16-57      |
| Louisiana DEQ            | http://www.deq.louisiana.gov/page/la-lab-accreditation   | 03016       |
| Maine DHS                | http://www.maine.gov/dhhs/   | WA01276     |
| Minnesota DOH            | http://www.health.state.mn.us/accreditation  | 053-999-457 |
| Nevada DEP               | http://ndep.nv.gov/bsdw/labservice.htm   | WA01276     |
| New Jersey DEP           | http://www.nj.gov/dep/enforcement/oqa.html   | WA005       |
| New York - DOH           | https://www.wadsworth.org/regulatory/elap  | 12060       |
| North Carolina DEQ       | https://deq.nc.gov/about/divisions/water-resources/water-resources-<br>data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-<br>certification | 605         |
| Oklahoma DEQ             | http://www.deq.state.ok.us/CSDnew/labcert.htm  | 9801        |
| Oregon – DEQ (NELAP)     | http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaborator<br>yAccreditation/Pages/index.aspx   | WA100010    |
| South Carolina DHEC      | http://www.scdhec.gov/environment/EnvironmentalLabCertification/   | 61002       |
| Texas CEQ                | http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html  | T104704427  |
| Washington DOE           | http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html   | C544        |
| Wyoming (EPA Region 8)   | https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-  | -           |
| Kelso Laboratory Website | www.alsglobal.com<br>to our laboratory's NFLAP-approved quality assurance program A complete   | NA          |

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

## Acronyms

| ASTM       | American Society for Testing and Materials  |
|------------|---|
| A2LA       | American Association for Laboratory Accreditation   |
| CARB       | California Air Resources Board  |
| CAS Number | Chemical Abstract Service registry Number   |
| CFC        | Chlorofluorocarbon  |
| CFU        | Colony-Forming Unit   |
| DEC        | Department of Environmental Conservation  |
| DEQ        | Department of Environmental Quality   |
| DHS        | Department of Health Services   |
| DOE        | Department of Ecology   |
| DOH        | Department of Health  |
| EPA        | U. S. Environmental Protection Agency   |
| ELAP       | Environmental Laboratory Accreditation Program  |
| GC         | Gas Chromatography  |
| GC/MS      | Gas Chromatography/Mass Spectrometry  |
| LOD        | Limit of Detection  |
| LOQ        | Limit of Quantitation   |
| LUFT       | Leaking Underground Fuel Tank   |
| M<br>MCL   | Modified<br>Maximum Contaminant Level is the highest permissible concentration of a substance<br>allowed in drinking water as established by the USEPA. |
| MDL        | Method Detection Limit  |
| MPN        | Most Probable Number  |
| MRL        | Method Reporting Limit  |
| NA         | Not Applicable  |
| NC         | Not Calculated  |
| NCASI      | National Council of the Paper Industry for Air and Stream Improvement   |
| ND         | Not Detected  |
| NIOSH      | National Institute for Occupational Safety and Health   |
| PQL        | Practical Quantitation Limit  |
| RCRA       | Resource Conservation and Recovery Act  |
| SIM        | Selected Ion Monitoring   |
| TPH        | Total Petroleum Hydrocarbons  |
| tr         | Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.  |

Analyst Summary report

# Client:Transalta Centralia Mining, LLCProject:LPLF CCR

080918-CCR-LPLF2R

K1807488-001

Water

Sample Name:

Sample Matrix:

Lab Code:

## Service Request: K1807488

**Date Collected:** 08/9/18 **Date Received:** 08/9/18

| Analysis Method<br>6010C<br>SM 2540 C       |   | Extracted/Digested By<br>JHINSON | <b>Analyzed By</b><br>AMCKORNEY<br>JMADISON                  |
|---|---|----------------------------------|--|
| Sample Name:<br>Lab Code:<br>Sample Matrix: | 080918-CCR-LPLF8<br>K1807488-002<br>Water |                                  | <b>te Collected:</b> 08/9/18<br><b>ite Received:</b> 08/9/18 |
| <b>Analysis Method</b><br>9056A             |   | Extracted/Digested By            | <b>Analyzed By</b><br>MRODRIGUEZ                             |

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# Sample Results

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## Metals

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Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: | K1807488       |
|---------------------------|-----------------------------------|------------------|----------------|
| Project:                  | LPLF CCR                          | Date Collected:  | 08/09/18 08:45 |
| Sample Matrix:            | Water                             | Date Received:   | 08/09/18 14:10 |
| Sample Name:<br>Lab Code: | 080918-CCR-LPLF2R<br>K1807488-001 | Basis:           | NA             |

**Total Metals** 

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | 0.325  | mg/L  | 0.021 | 1    | 08/22/18 13:57 | 08/13/18       |   |
| Calcium      | 6010C              | 463    | mg/L  | 0.021 | 1    | 08/22/18 13:57 | 08/13/18       |   |



## **General Chemistry**

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Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1807488             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 08/09/18 08:45 |
| Sample Matrix:            | Water                             | <b>Date Received:</b> 08/09/18 14:10  |
| Sample Name:<br>Lab Code: | 080918-CCR-LPLF2R<br>K1807488-001 | Basis: NA                             |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 3480   | mg/L  | 5.0 | 1    | 08/09/18 15:15 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1807488             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 08/09/18 09:20 |
| Sample Matrix:            | Water                            | Date Received: 08/09/18 14:10         |
| Sample Name:<br>Lab Code: | 080918-CCR-LPLF8<br>K1807488-002 | Basis: NA                             |

|              | Analysis |        |       |     |      |                |   |
|--------------|----------|--------|-------|-----|------|----------------|---|
| Analyte Name | Method   | Result | Units | MRL | Dil. | Date Analyzed  | Q |
| Sulfate      | 9056A    | 2520   | mg/L  | 100 | 1000 | 08/13/18 13:59 |   |



# QC Summary Forms

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## Metals

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Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K18 | 807488 |
|---------------------------|---------------------------------|----------------------|--------|
| Project:                  | LPLF CCR                        | Date Collected: NA   |        |
| Sample Matrix:            | Water                           | Date Received: NA    |        |
| Sample Name:<br>Lab Code: | Method Blank<br>KQ1810901-04    | Basis: NA            |        |

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | ND U   | mg/L  | 0.021 | 1    | 08/22/18 12:30 | 08/13/18       |   |
| Calcium      | 6010C              | ND U   | mg/L  | 0.021 | 1    | 08/22/18 12:30 | 08/13/18       |   |

QA/QC Report

Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Water

### Service Request: K1807488 Date Analyzed: 08/22/18

### Lab Control Sample Summary Total Metals

Units:mg/L Basis:NA

## Lab Control Sample

KQ1810901-03

| Analyte Name | <b>Analytical Method</b> | Result | Spike Amount | % Rec | % Rec Limits |
|--------------|--------------------------|--------|--------------|-------|--------------|
| Boron        | 6010C                    | 0.436  | 0.500        | 87    | 80-120       |
| Calcium      | 6010C                    | 11.2   | 12.5         | 90    | 80-120       |



## **General Chemistry**

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Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: | K1807488 |
|---------------------------|---------------------------------|------------------|----------|
| Project:                  | LPLF CCR                        | Date Collected:  | NA       |
| Sample Matrix:            | Water                           | Date Received:   | NA       |
| Sample Name:<br>Lab Code: | Method Blank<br>K1807488-MB1    | Basis:           | NA       |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | ND U   | mg/L  | 5.0 | 1    | 08/09/18 15:15 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: | K1807488 |
|---------------------------|---------------------------------|------------------|----------|
| Project:                  | LPLF CCR                        | Date Collected:  | NA       |
| Sample Matrix:            | Water                           | Date Received:   | NA       |
| Sample Name:<br>Lab Code: | Method Blank<br>K1807488-MB1    | Basis:           | NA       |

| Analyte Name | Analysis Method | Result | Units | MRL  | Dil. | Date Analyzed  | Q |
|--------------|-----------------|--------|-------|------|------|----------------|---|
| Sulfate      | 9056A           | ND U   | mg/L  | 0.10 | 1    | 08/13/18 10:27 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: | K1807488 |
|---------------------------|---------------------------------|------------------|----------|
| Project:                  | LPLF CCR                        | Date Collected:  | NA       |
| Sample Matrix:            | Water                           | Date Received:   | NA       |
| Sample Name:<br>Lab Code: | Method Blank<br>K1807488-MB2    | Basis:           | NA       |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | ND U   | mg/L  | 5.0 | 1    | 08/09/18 15:15 |   |

QA/QC Report

Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Water

#### Service Request: K1807488 Date Analyzed: 08/09/18 - 08/13/18

#### Lab Control Sample Summary General Chemistry Parameters

Units:mg/L Basis:NA

#### Lab Control Sample K1807488-LCS

Analyte Name **Analytical Method** Result **Spike Amount** % Rec % Rec Limits Solids, Total Dissolved SM 2540 C 482 523 92 85-115 Sulfate 9056A 5.31 5.00 106 90-110



Dennis Morr Transalta Centralia Mining, LLC 913 Big Hanaford Rd Centralia, WA 98531

### Laboratory Results for: LPLF CCR

Dear Dennis,

Enclosed are the results of the sample(s) submitted to our laboratory October 25, 2018 For your reference, these analyses have been assigned our service request number **K1810468**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3356. You may also contact me via email at Kurt.Clarkson@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kunt Clauson

Kurt Clarkson Sr. Project Manager

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## Narrative Documents

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com



Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Ground Water

Service Request: K1810468 Date Received: 10/25/2018

#### **CASE NARRATIVE**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS).

#### Sample Receipt:

Five ground water samples were received for analysis at ALS Environmental on 10/25/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### <u>Metals:</u>

No significant anomalies were noted with this analysis.

#### General Chemistry:

No significant anomalies were noted with this analysis.

Runt Clauson

Approved by

Date 11/02/2018



### SAMPLE DETECTION SUMMARY

| LIENT ID: 102418-CCR-LPLF1 |         |      |     |       |          |              |
|----------------------------|---------|------|-----|-------|----------|--------------|
| Analyte                    | Results | Flag | MDL | MRL   | Units    | Method       |
| Solids, Total Dissolved    | 2610    |      |     | 5.0   | mg/L     | SM 2540 C    |
| Chloride                   | 2.4     |      |     | 1.0   | mg/L     | 9056A        |
| рН                         | 6.73    |      |     |       | pH Units | SM 4500-H+ B |
| Sulfate                    | 1430    |      |     | 50    | mg/L     | 9056A        |
| Boron                      | 0.561   |      |     | 0.021 | mg/L     | 6010C        |
| Calcium                    | 185     |      |     | 0.021 | mg/L     | 6010C        |

| CLIENT ID: 053018-CCR-LPLF2R | Lab ID: K1810468-002 |      |     |       |          |              |  |  |  |  |  |
|------------------------------|----------------------|------|-----|-------|----------|--------------|--|--|--|--|--|
| Analyte                      | Results              | Flag | MDL | MRL   | Units    | Method       |  |  |  |  |  |
| Solids, Total Dissolved      | 3680                 |      |     | 5.0   | mg/L     | SM 2540 C    |  |  |  |  |  |
| Chloride                     | 8.3                  |      |     | 1.0   | mg/L     | 9056A        |  |  |  |  |  |
| рН                           | 6.41                 |      |     |       | pH Units | SM 4500-H+ B |  |  |  |  |  |
| Sulfate                      | 2120                 |      |     | 50    | mg/L     | 9056A        |  |  |  |  |  |
| Boron                        | 0.329                |      |     | 0.021 | mg/L     | 6010C        |  |  |  |  |  |
| Calcium                      | 475                  |      |     | 0.021 | mg/L     | 6010C        |  |  |  |  |  |

| CLIENT ID: FD           |         | Lab ID: K1810468-003 |     |       |          |              |  |  |  |  |  |
|-------------------------|---------|----------------------|-----|-------|----------|--------------|--|--|--|--|--|
| Analyte                 | Results | Flag                 | MDL | MRL   | Units    | Method       |  |  |  |  |  |
| Solids, Total Dissolved | 3590    |                      |     | 5.0   | mg/L     | SM 2540 C    |  |  |  |  |  |
| Chloride                | 7.0     |                      |     | 1.0   | mg/L     | 9056A        |  |  |  |  |  |
| pН                      | 5.99    |                      |     |       | pH Units | SM 4500-H+ B |  |  |  |  |  |
| Sulfate                 | 2140    |                      |     | 50    | mg/L     | 9056A        |  |  |  |  |  |
| Boron                   | 0.959   |                      |     | 0.021 | mg/L     | 6010C        |  |  |  |  |  |
| Calcium                 | 374     |                      |     | 0.021 | mg/L     | 6010C        |  |  |  |  |  |

| CLIENT ID: 102418-CCR-LPLF7R | Lab ID: K1810468-004 |      |     |       |          |              |  |  |  |  |  |  |
|------------------------------|----------------------|------|-----|-------|----------|--------------|--|--|--|--|--|--|
| Analyte                      | Results              | Flag | MDL | MRL   | Units    | Method       |  |  |  |  |  |  |
| Solids, Total Dissolved      | 2430                 |      |     | 5.0   | mg/L     | SM 2540 C    |  |  |  |  |  |  |
| Chloride                     | 8.4                  |      |     | 1.0   | mg/L     | 9056A        |  |  |  |  |  |  |
| рН                           | 6.46                 |      |     |       | pH Units | SM 4500-H+ B |  |  |  |  |  |  |
| Sulfate                      | 1220                 |      |     | 50    | mg/L     | 9056A        |  |  |  |  |  |  |
| Boron                        | 0.340                |      |     | 0.021 | mg/L     | 6010C        |  |  |  |  |  |  |
| Calcium                      | 196                  |      |     | 0.021 | mg/L     | 6010C        |  |  |  |  |  |  |

| CLIENT ID: 053018-CCR-LPLF8 |         |      |     |       |          |              |
|-----------------------------|---------|------|-----|-------|----------|--------------|
| Analyte                     | Results | Flag | MDL | MRL   | Units    | Method       |
| Solids, Total Dissolved     | 3720    |      |     | 5.0   | mg/L     | SM 2540 C    |
| Chloride                    | 6.9     |      |     | 1.0   | mg/L     | 9056A        |
| рН                          | 6.02    |      |     |       | pH Units | SM 4500-H+ B |
| Sulfate                     | 2530    |      |     | 100   | mg/L     | 9056A        |
| Boron                       | 0.940   |      |     | 0.021 | mg/L     | 6010C        |
| Calcium                     | 364     |      |     | 0.021 | mg/L     | 6010C        |



## Sample Receipt Information

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

#### SAMPLE CROSS-REFERENCE

| CLIENT SAMPLE ID  | DATE       | TIME  |
|-------------------|------------|---|
| 102418-CCR-LPLF1  | 10/24/2018 | 0925  |
| 053018-CCR-LPLF2R | 10/24/2018 | 1155  |
| FD                | 10/24/2018 |   |
| 102418-CCR-LPLF7R | 10/24/2018 | 0950  |
| 053018-CCR-LPLF8  | 10/24/2018 | 1030  |
|                   |            | 102418-CCR-LPLF1       10/24/2018         053018-CCR-LPLF2R       10/24/2018         FD       10/24/2018         102418-CCR-LPLF7R       10/24/2018 |



ADDRESS 1317 South 13th Ave., Kelso, WA 98626 PHONE 1 360 577 7222 FAX 1 360 636 1068

K1810468

Work Order No.: 80819

Chain of Custody

Part of the ALS Group A Campbell Brothers Limited Company

| Project Manager: Bill Sche   | er                                    |                                       |                  |             |               |                 |       |          |                 |          | Bill  | to:     |         |           |             | heer      |             |                     |             |  |                 |   |                |                  |
|--|---------------------------------------|---------------------------------------|------------------|-------------|---------------|-----------------|-------|----------|-----------------|----------|-------|---------|---------|-----------|-------------|-----------|-------------|---------------------|-------------|--|-----------------|---|----------------|------------------|
|  |                                       | Mining Com                            | pany             |             |               |                 |       |          |                 |          |       | npan    |         |           |             |           | Cent        |                     |             | ng   |                 |   |                |                  |
|  | Hanaford F                            |                                       |                  |             |               |                 |       |          |                 |          |       | iress   |         |           |             |           | anafo       |                     |             |  |                 |   |                |                  |
|  | a, WA 985                             |                                       |                  |             |               |                 |       |          |                 |          | -     |         | te ZIP: |           |             | · · · · · | <u>WA 9</u> |                     |             |  | -               |   |                |                  |
| the state of the s | er@transa                             | <u>ilta.com</u>                       |                  | Phone:      | 360           | )-33(           | ) 23  | 32       |                 | <u> </u> | Em    |         |         |           |             |           | @tran       | <u>salta</u>        | com         |  | po              | )#  |                |                  |
| Project Name: LPLF CC  | CR                                    | · · · · · · · · · · · · · · · · · · · |                  |             |               | 3 <u>60 -</u> 8 |       | 1000     | ](set))         |          |       | REC     | QUEST   | ED        |             | LYSI      | <u>S</u>    | <u>():::):</u><br>T |             | in de la comencia de<br>La comencia de la come |                 | <u>9999999</u>                            | 99999 (d)<br>M | TAT              |
| Project Number:  |                                       |                                       |                  | ······      | -             |                 |       |          | [               |          |       |         |         |           |             |           |             |                     |             |  |                 | i l                                       | ĮL,            | ] Routine 21day  |
|  | 5456 Line                             | <u>90</u>                             |                  |             |               |                 |       |          |                 |          |       |         |         |           |             |           |             |                     |             |  |                 | Same Day 100                              |                |                  |
| Sampler's Name: Bill Sche  | er                                    |                                       |                  |             |               |                 |       |          |                 |          |       |         |         |           |             |           |             |                     |             |  |                 |   |                | Next Day ***     |
| S  | AMPLE R                               | ECEIPT                                |                  |             |               |                 |       |          | ĺ               |          |       |         |         |           |             |           |             |                     |             |  |                 |   |                | ] 3 Day          |
| Temperature (°C):  | Š                                     | Temp Bla                              | nk Present       |             |               |                 |       |          |                 |          |       |         |         |           |             |           |             |                     |             |  | D               | 🗙 5 Day 50                                |                |                  |
| Received Intact:   | Yes                                   | No N/A                                | Wet Ice /        | Blue Ice    |               |                 |       |          |                 |          |       |         |         |           |             |           |             |                     |             |  |                 |   |                | Surcharges.      |
| Cooler Custody Seals:  | · · · · · · · · · · · · · · · · · · · | No N/A                                | Total Cont       | tainers:    |               |                 |       |          |                 |          |       |         |         |           |             |           |             |                     |             |  | Please call for |   |                |                  |
| Sample Custody Seals:  | Yes                                   | No N/A                                |                  |             | Ē.            |                 |       |          |                 |          |       |         |         |           |             |           |             |                     |             |  |                 |   | availability   |                  |
| Sample Identification  | Matrix                                | Date<br>Sampled                       | Time<br>Sampled  | Lab ID      | of Containers |                 | uo    | Calcium  | Chioride        | Fluoride |       | Sulfate |         |           |             |           |             |                     |             |  |                 |   |                | Due Date:        |
|  |                                       |                                       |                  |             | No.           |                 | Boron | Cal      | Ē               | Flue     | Hd    | Sulf    | SGT     |           |             |           |             |                     |             |  |                 |   | 53             | Comments         |
| 102418 - CCR - LPLF1   | GW                                    | 10/24/2018                            | 9:25             |             | 3             |                 | X     | X        | X               | X        | X     | X       | X       |           |             |           |             |                     |             |  |                 |   |                |                  |
| 053018 - CCR - LPLF2R  | GW                                    | 10/24/2018                            | 11:55            |             | 3             |                 | X     | X        | X               | X        | X     | X       | x       |           |             |           |             |                     |             |  |                 |   | N              | S/MSD            |
| FD   | GW                                    |                                       |                  |             | 3             |                 | X     | X        | X               | X        | X     | X       | X       |           |             |           |             |                     |             |  |                 |   |                |                  |
| 102418 - CCR - LPLF7R  | GW                                    | 10/24/2018                            | 9:50             | ]           | 9             |                 | X     | X        | X               | X        | X     | X       | X       |           |             |           |             |                     |             |  |                 |   |                |                  |
| 053018 - CCR - LPLF8   | GW                                    | 10/24/2018                            | 10:30            |             | 3             |                 | x     | X        | x               | x        | x     | x       | x       |           |             | .         |             |                     |             |  |                 |   |                |                  |
|  | <u> </u>                              |                                       |                  |             |               |                 |       | L        | ļ               |          |       |         |         |           |             |           |             |                     |             |  |                 |   |                |                  |
|  |                                       |                                       | <u> </u>         |             |               |                 |       |          |                 |          |       |         |         |           |             |           |             |                     |             |  |                 |   |                |                  |
| ·····  |                                       |                                       |                  |             |               |                 |       |          |                 |          |       |         |         |           |             |           |             |                     |             |  |                 |   | _              |                  |
|  |                                       |                                       |                  |             |               |                 |       |          |                 |          |       |         |         |           |             |           |             |                     |             |  |                 |   |                |                  |
| Dissolved  |                                       | g, Al, As, B, B                       |                  |             |               |                 |       |          |                 |          |       |         |         |           |             |           |             |                     | ······      |  | Add             | 11 A. |                | ethods Available |
| Total  |                                       | g, Al, As, B, B                       |                  | , Co, Cr, ( | Cu, Fe        | e, K, I         | Li, M | g, Mr    | n, Mo           | , Na,    | Ni, f | P, Pb,  | Sb, Se, | si, s     | in, Sr      | , TI, V   |             |                     |             |  |                 |   | Jpon           | Request          |
|  | RE                                    | LINQUISH                              | ED BY<br>gnature |             | sanas<br>sans | <u>.</u>        |       |          | 99 <u>9</u> 972 |          |       |         |         |           |             |           | KE(         | LEIV                | ED          | NAMES.   |                 |   |                | Date /Times      |
| 지수는 영상에 가지 않는 것은 것은 것을 가지 않는 것을 가지 않는 것을 가지 않는 것을 하는 것이다.  |                                       |                                       | anaturo          |             |               | vat             | te/Ti | ime      |                 | (0.11)   |       | P       | rint Na | ume.      | e Signature |           | 동안 같은       | Date/Time           |             |  |                 |   |                |                  |
| Print Name<br>William Scheer   |                                       | H/14                                  | gnature          |             |               | 25/2            |       | <u>.</u> | 2012222         | ~        | 1     |         | 210     | 104220422 | 12.612.642  |           | 17          | 7/                  | <del></del> |  | enta di citi    | <u></u>                                   | <u> 200</u>    | 1.1.             |

| (ALS) |  |
|-------|--|

| Cooler Receipt and Preservation Form         Client $\boxed{ranselta}$ Service Request K18 10468         Received: $10/25/18$ Opened: $10/25/18$ By: CG Unloaded: $10/25/18$ By: CG         1. Samples were received via?       USPS Fed Ex UPS DHL PDX Courier Hand Delivered         2. Samples were received in: (circle)       Coaler Box Envelope Other NA         3. Were custody seals on coolers?       NA CO N       If yes, how many and where? 1 From t         If present, were custody seals intact?       CN       If present, were they signed and dated?       CN |
|---|
| Received: $10/25/18$ Opened: $10/25/18$ By:       Unloaded: $10/25/18$ By:         1. Samples were received via?       USPS       Fed Ex       UPS       DHL       PDX       Courier       Hand Delivered         2. Samples were received in: (circle)       Cooler       Box       Envelope       Other       NA         3. Were custody seals on coolers?       NA       So       N       If yes, how many and where?       If Yes, how many and where?  |
| Received: $10 25 18$ Opened: $10 25 18$ By: C       Unloaded: $10 25 18$ By: C         1. Samples were received via?       USPS       Fed Ex       UPS       DHL       PDX       Courier       Hand Delivered         2. Samples were received in: (circle)       Cooler       Box       Envelope       Other       NA         3. Were custody seals on coolers?       NA       N       If yes, how many and where?       If Yes, how many and where?       If Yes, how many and where?   |
| 1. Samples were received via?       USPS       Fed Ex       UPS       DHL       PDX       Courier       Hand Delivered         2. Samples were received in: (circle)       Cooler       Box       Envelope       Other       NA         3. Were custody seals on coolers?       NA       N       If yes, how many and where?       If From f  |
| 2. Samples were received in: (circle)       Cooler       Box       Envelope       Other       NA         3. Were custody seals on coolers?       NA       N       If yes, how many and where?       If yes, how many and where?       NA  |
| 3. Were <u>custody seals</u> on coolers? NA (D) N If yes, how many and where? I From t  |
|   |
| If present, were custody seals intact? $\bigcirc$ N If present, were they signed and dated? $\bigcirc$ N  |
|   |
| Raw<br>Cooler Temp         Corrected.<br>Cooler Temp         Raw<br>Temp Blank         Corrected<br>Temp Blank         Corr.<br>Factor         Thermometer<br>ID         Cooler/COC ID         Tracking Number  |
| -0.9 -1.0 5.2 5.1 -0.1 356  |
|   |
|   |
|   |
| 4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves  |
| 5. Were custody papers properly filled out (ink, signed, etc.)?   |
| 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA (P) N   |
| If applicable, tissue samples were received: Frozen Partially Thawed Thawed   |
| 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA $(Y)$ N   |
| 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA (1954) N   |
| 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA $\vec{Y}$ N   |
| 10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below NA Y  |
| 11. Were VOA vials received without headspace? Indicate in the table below.   |
| 12. Was C12/Res negative? NA Y N  |
| Sample ID on Bottle Sample ID on COC Identified by:   |
| 102418CCR-LPLFZR 053018-CCR-LPLFZR Elimination  |
| 102418-CCR-LPLF8 053018-CCR-LPLF8 Elimination   |

| Sample ID                       | Bottle Count<br>Bottle Type | 1        | Head-<br>space | Broke | рН       | Reagent | Volume<br>added | Reagent Lot<br>Number | Initials | Time    |
|---------------------------------|-----------------------------|----------|----------------|-------|----------|---------|-----------------|-----------------------|----------|---------|
| 102418-CCR-LPLF7R               | 1-250m1 P                   |          |                |       | $\times$ | HNO3    | 0.5 ml          | RE1-48-4              | CG       | 1420    |
|                                 |                             | <u> </u> |                |       |          |         |                 |                       |          |         |
|                                 |                             |          |                |       |          |         | 1               |                       |          |         |
|                                 |                             | <u> </u> |                |       |          | ·····   |                 |                       |          |         |
| Notes, Discreptincies, & Result | tians:                      | L<br>F   | L<br>Zece      |       | L        | 3x vol  | L               | for LPL               | F7       | R       |
| MUE                             | $2\Pi$                      |          | <u> </u>       | Comp  | nent     | szys 1  | MS/A            | for LPL<br>15D on L   | PLFZ     | 2R.     |
|                                 |                             | <b>i</b> |                |       |          |         |                 |                       |          | <u></u> |
| SHORT HOL                       | D IIME                      | 8<br>51  |                |       |          |         |                 |                       |          |         |

7/25/16

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## **Miscellaneous Forms**

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

#### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

#### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- $i \,$   $\,$  The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
   DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### Additional Petroleum Hydrocarbon Specific Qualifiers

- ${f F}$  The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

### ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso State Certifications, Accreditations, and Licenses

| Agency                   | Web Site   | Number      |
|--------------------------|--|-------------|
| Alaska DEH               | http://dec.alaska.gov/eh/lab/cs/csapproval.htm   | UST-040     |
| Arizona DHS              | http://www.azdhs.gov/lab/license/env.htm   | AZ0339      |
| Arkansas - DEQ           | http://www.adeq.state.ar.us/techsvs/labcert.htm  | 88-0637     |
| California DHS (ELAP)    | http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx  | 2795        |
| DOD ELAP                 | http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm   | L16-58-R4   |
| Florida DOH              | http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm  | E87412      |
| Hawaii DOH               | http://health.hawaii.gov/  | -           |
| ISO 17025                | http://www.pjlabs.com/   | L16-57      |
| Louisiana DEQ            | http://www.deq.louisiana.gov/page/la-lab-accreditation   | 03016       |
| Maine DHS                | http://www.maine.gov/dhhs/   | WA01276     |
| Minnesota DOH            | http://www.health.state.mn.us/accreditation  | 053-999-457 |
| Nevada DEP               | http://ndep.nv.gov/bsdw/labservice.htm   | WA01276     |
| New Jersey DEP           | http://www.nj.gov/dep/enforcement/oqa.html   | WA005       |
| New York - DOH           | https://www.wadsworth.org/regulatory/elap  | 12060       |
| North Carolina DEQ       | https://deq.nc.gov/about/divisions/water-resources/water-resources-<br>data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-<br>certification | 605         |
| Oklahoma DEQ             | http://www.deq.state.ok.us/CSDnew/labcert.htm  | 9801        |
| Oregon – DEQ (NELAP)     | http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaborator<br>yAccreditation/Pages/index.aspx   | WA100010    |
| South Carolina DHEC      | http://www.scdhec.gov/environment/EnvironmentalLabCertification/   | 61002       |
| Texas CEQ                | http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html  | T104704427  |
| Washington DOE           | http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html   | C544        |
| Wyoming (EPA Region 8)   | https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-  | -           |
| Kelso Laboratory Website | www.alsglobal.com<br>to our laboratory's NELAP-approved quality assurance program. A complete  | NA          |

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

### Acronyms

| ASTM       | American Society for Testing and Materials  |
|------------|---|
| A2LA       | American Association for Laboratory Accreditation   |
| CARB       | California Air Resources Board  |
| CAS Number | Chemical Abstract Service registry Number   |
| CFC        | Chlorofluorocarbon  |
| CFU        | Colony-Forming Unit   |
| DEC        | Department of Environmental Conservation  |
| DEQ        | Department of Environmental Quality   |
| DHS        | Department of Health Services   |
| DOE        | Department of Ecology   |
| DOH        | Department of Health  |
| EPA        | U. S. Environmental Protection Agency   |
| ELAP       | Environmental Laboratory Accreditation Program  |
| GC         | Gas Chromatography  |
| GC/MS      | Gas Chromatography/Mass Spectrometry  |
| LOD        | Limit of Detection  |
| LOQ        | Limit of Quantitation   |
| LUFT       | Leaking Underground Fuel Tank   |
| M<br>MCL   | Modified<br>Maximum Contaminant Level is the highest permissible concentration of a substance<br>allowed in drinking water as established by the USEPA. |
| MDL        | Method Detection Limit  |
| MPN        | Most Probable Number  |
| MRL        | Method Reporting Limit  |
| NA         | Not Applicable  |
| NC         | Not Calculated  |
| NCASI      | National Council of the Paper Industry for Air and Stream Improvement   |
| ND         | Not Detected  |
| NIOSH      | National Institute for Occupational Safety and Health   |
| PQL        | Practical Quantitation Limit  |
| RCRA       | Resource Conservation and Recovery Act  |
| SIM        | Selected Ion Monitoring   |
| TPH        | Total Petroleum Hydrocarbons  |
| tr         | Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.  |

Analyst Summary report

#### **Client:** Transalta Centralia Mining, LLC **Project:** LPLF CCR

102418-CCR-LPLF1

K1810468-001

Ground Water

Sample Name:

Sample Matrix:

Lab Code:

#### Service Request: K1810468

Date Collected: 10/24/18 **Date Received:** 10/25/18

| <b>Analysis Method</b><br>6010C<br>9056A<br>SM 2540 C<br>SM 4500-H+ B |   | <b>Extracted/Digested By</b><br>JHINSON | <b>Analyzed By</b><br>EMCALLISTER<br>MVALVERDE<br>JMADISON<br>DBRADBURY |
|---|---|---|---|
| Sample Name:<br>Lab Code:   | 053018-CCR-LPLF2R<br>K1810468-002                 |   | <b>Date Collected:</b> 10/24/18<br><b>Date Received:</b> 10/25/18       |
| Sample Matrix:  | Ground Water                                      |   | <b>Date Received.</b> 10/25/10  |
| <b>Analysis Method</b><br>6010C<br>9056A<br>SM 2540 C<br>SM 4500-H+ B |   | <b>Extracted/Digested By</b><br>JHINSON | <b>Analyzed By</b><br>EMCALLISTER<br>MVALVERDE<br>JMADISON<br>DBRADBURY |
| Sample Name:<br>Lab Code:<br>Sample Matrix:                           | FD<br>K1810468-003<br>Ground Water                |   | <b>Date Collected:</b> 10/24/18<br><b>Date Received:</b> 10/25/18       |
| <b>Analysis Method</b><br>6010C<br>9056A<br>SM 2540 C<br>SM 4500-H+ B |   | Extracted/Digested By<br>JHINSON        | <b>Analyzed By</b><br>EMCALLISTER<br>MVALVERDE<br>JMADISON<br>DBRADBURY |
| Sample Name:<br>Lab Code:<br>Sample Matrix:                           | 102418-CCR-LPLF7R<br>K1810468-004<br>Ground Water |   | <b>Date Collected:</b> 10/24/18<br><b>Date Received:</b> 10/25/18       |
| <b>Analysis Method</b><br>6010C                                       |   | <b>Extracted/Digested By</b><br>JHINSON | <b>Analyzed By</b><br>EMCALLISTER                                       |

Superset Reference:18-0000486409 rev 00

Analyst Summary report

## Client:Transalta Centralia Mining, LLCProject:LPLF CCR

102418-CCR-LPLF7R

K1810468-004

Ground Water

Sample Name:

Sample Matrix:

Lab Code:

#### Service Request: K1810468

**Date Collected:** 10/24/18 **Date Received:** 10/25/18

| <b>Analysis Method</b><br>9056A<br>SM 2540 C<br>SM 4500-H+ B          |  | Extracted/Digested By                   | <b>Analyzed By</b><br>MVALVERDE<br>JMADISON<br>DBRADBURY                |
|---|--|---|---|
| Sample Name:<br>Lab Code:<br>Sample Matrix:                           | 053018-CCR-LPLF8<br>K1810468-005<br>Ground Water |   | te Collected: 10/24/18<br>nte Received: 10/25/18                        |
| <b>Analysis Method</b><br>6010C<br>9056A<br>SM 2540 C<br>SM 4500-H+ B |  | <b>Extracted/Digested By</b><br>JHINSON | <b>Analyzed By</b><br>EMCALLISTER<br>MVALVERDE<br>JMADISON<br>DBRADBURY |



## Sample Results

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com



## Metals

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1810468             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 10/24/18 09:25 |
| Sample Matrix:            | Ground Water                     | Date Received: 10/25/18 14:10         |
| Sample Name:<br>Lab Code: | 102418-CCR-LPLF1<br>K1810468-001 | Basis: NA                             |

| Analvte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analvzed  | Date Extracted | 0        |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|----------|
| Boron        | 6010C              | 0.561  | mg/L  | 0.021 | 1    | 10/30/18 10:09 | 10/26/18       | <u> </u> |
| Calcium      | 6010C              | 185    | mg/L  | 0.021 | 1    | 10/30/18 10:09 | 10/26/18       |          |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1810468      |
|---------------------------|-----------------------------------|--------------------------------|
| Project:                  | LPLF CCR                          | Date Collected: 10/24/18 11:55 |
| Sample Matrix:            | Ground Water                      | Date Received: 10/25/18 14:10  |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF2R<br>K1810468-002 | Basis: NA                      |

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | 0.329  | mg/L  | 0.021 | 1    | 10/30/18 10:12 | 10/26/18       |   |
| Calcium      | 6010C              | 475    | mg/L  | 0.021 | 1    | 10/30/18 10:12 | 10/26/18       |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K1810468            |
|---------------------------|---------------------------------|--------------------------------------|
| Project:                  | LPLF CCR                        | Date Collected: 10/24/18             |
| Sample Matrix:            | Ground Water                    | <b>Date Received:</b> 10/25/18 14:10 |
| Sample Name:<br>Lab Code: | FD<br>K1810468-003              | Basis: NA                            |

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | 0.959  | mg/L  | 0.021 | 1    | 10/30/18 10:15 | 10/26/18       |   |
| Calcium      | 6010C              | 374    | mg/L  | 0.021 | 1    | 10/30/18 10:15 | 10/26/18       |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1810468             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 10/24/18 09:50 |
| Sample Matrix:            | Ground Water                      | Date Received: 10/25/18 14:10         |
| Sample Name:<br>Lab Code: | 102418-CCR-LPLF7R<br>K1810468-004 | Basis: NA                             |

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | 0.340  | mg/L  | 0.021 | 1    | 10/30/18 09:58 | 10/26/18       |   |
| Calcium      | 6010C              | 196    | mg/L  | 0.021 | 1    | 10/30/18 09:58 | 10/26/18       |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1810468             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 10/24/18 10:30 |
| Sample Matrix:            | Ground Water                     | Date Received: 10/25/18 14:10         |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF8<br>K1810468-005 | Basis: NA                             |

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | 0.940  | mg/L  | 0.021 | 1    | 10/30/18 10:18 | 10/26/18       |   |
| Calcium      | 6010C              | 364    | mg/L  | 0.021 | 1    | 10/30/18 10:18 | 10/26/18       |   |



## **General Chemistry**

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1810468             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 10/24/18 09:25 |
| Sample Matrix:            | Ground Water                     | <b>Date Received:</b> 10/25/18 14:10  |
| Sample Name:<br>Lab Code: | 102418-CCR-LPLF1<br>K1810468-001 | Basis: NA                             |

| Analyte Name | <b>Analysis Method</b> | Result | Units    | MRL | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|----------|-----|------|----------------|---|
| Chloride     | 9056A                  | 2.4    | mg/L     | 1.0 | 10   | 10/31/18 17:12 |   |
| Fluoride     | 9056A                  | ND Ui  | mg/L     | 2.0 | 10   | 10/31/18 17:12 |   |
| pН           | SM 4500-H+ B           | 6.73   | pH Units | -   | 1    | 10/25/18 18:06 | Н |
| Sulfate      | 9056A                  | 1430   | mg/L     | 50  | 500  | 10/31/18 17:30 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1810468             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 10/24/18 09:25 |
| Sample Matrix:            | Ground Water                     | Date Received: 10/25/18 14:10         |
| Sample Name:<br>Lab Code: | 102418-CCR-LPLF1<br>K1810468-001 | Basis: NA                             |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 2610   | mg/L  | 5.0 | 1    | 10/29/18 11:07 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1810468             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 10/24/18 11:55 |
| Sample Matrix:            | Ground Water                      | Date Received: 10/25/18 14:10         |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF2R<br>K1810468-002 | Basis: NA                             |

| Analyte Name | <b>Analysis Method</b> | Result | Units    | MRL | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|----------|-----|------|----------------|---|
| Chloride     | 9056A                  | 8.3    | mg/L     | 1.0 | 10   | 10/31/18 17:40 |   |
| Fluoride     | 9056A                  | ND Ui  | mg/L     | 2.0 | 10   | 10/31/18 17:40 |   |
| pН           | SM 4500-H+ B           | 6.41   | pH Units | -   | 1    | 10/25/18 18:08 | Н |
| Sulfate      | 9056A                  | 2120   | mg/L     | 50  | 500  | 10/31/18 17:50 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1810468      |
|---------------------------|-----------------------------------|--------------------------------|
| Project:                  | LPLF CCR                          | Date Collected: 10/24/18 11:55 |
| Sample Matrix:            | Ground Water                      | Date Received: 10/25/18 14:10  |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF2R<br>K1810468-002 | Basis: NA                      |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 3680   | mg/L  | 5.0 | 1    | 10/29/18 11:07 |   |

Analytical Report

| Client:        | Transalta Centralia Mining, LLC | Service Request: | K1810468       |
|----------------|---------------------------------|------------------|----------------|
| Project:       | LPLF CCR                        | Date Collected:  | 10/24/18       |
| Sample Matrix: | Ground Water                    | Date Received:   | 10/25/18 14:10 |
| a              |                                 |                  |                |
| Sample Name:   | FD                              | Basis:           | NA             |
| Lab Code:      | K1810468-003                    |                  |                |
|                |                                 |                  |                |
|                |                                 |                  |                |

| Analyte Name | <b>Analysis Method</b> | Result | Units    | MRL | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|----------|-----|------|----------------|---|
| Chloride     | 9056A                  | 7.0    | mg/L     | 1.0 | 10   | 10/31/18 18:00 |   |
| Fluoride     | 9056A                  | ND Ui  | mg/L     | 2.0 | 10   | 10/31/18 18:00 |   |
| pН           | SM 4500-H+ B           | 5.99   | pH Units | -   | 1    | 10/25/18 18:10 |   |
| Sulfate      | 9056A                  | 2140   | mg/L     | 50  | 500  | 11/01/18 09:56 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K1810468            |
|---------------------------|---------------------------------|--------------------------------------|
| Project:                  | LPLF CCR                        | Date Collected: 10/24/18             |
| Sample Matrix:            | Ground Water                    | <b>Date Received:</b> 10/25/18 14:10 |
| Sample Name:<br>Lab Code: | FD<br>K1810468-003              | Basis: NA                            |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 3590   | mg/L  | 5.0 | 1    | 10/31/18 14:57 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1810468             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 10/24/18 09:50 |
| Sample Matrix:            | Ground Water                      | Date Received: 10/25/18 14:10         |
| Sample Name:<br>Lab Code: | 102418-CCR-LPLF7R<br>K1810468-004 | Basis: NA                             |

| Analyte Name | <b>Analysis Method</b> | Result | Units    | MRL | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|----------|-----|------|----------------|---|
| Chloride     | 9056A                  | 8.4    | mg/L     | 1.0 | 10   | 10/31/18 16:32 |   |
| Fluoride     | 9056A                  | ND Ui  | mg/L     | 2.0 | 10   | 10/31/18 16:32 |   |
| pН           | SM 4500-H+ B           | 6.46   | pH Units | -   | 1    | 10/25/18 18:15 | Н |
| Sulfate      | 9056A                  | 1220   | mg/L     | 50  | 500  | 10/31/18 21:03 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1810468             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 10/24/18 09:50 |
| Sample Matrix:            | Ground Water                      | <b>Date Received:</b> 10/25/18 14:10  |
| Sample Name:<br>Lab Code: | 102418-CCR-LPLF7R<br>K1810468-004 | Basis: NA                             |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 2430   | mg/L  | 5.0 | 1    | 10/31/18 14:57 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1810468             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 10/24/18 10:30 |
| Sample Matrix:            | Ground Water                     | <b>Date Received:</b> 10/25/18 14:10  |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF8<br>K1810468-005 | Basis: NA                             |

| Analyte Name | <b>Analysis Method</b> | Result | Units    | MRL | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|----------|-----|------|----------------|---|
| Chloride     | 9056A                  | 6.9    | mg/L     | 1.0 | 10   | 10/31/18 18:10 |   |
| Fluoride     | 9056A                  | ND Ui  | mg/L     | 2.0 | 10   | 10/31/18 18:10 |   |
| pН           | SM 4500-H+ B           | 6.02   | pH Units | -   | 1    | 10/25/18 18:19 | Н |
| Sulfate      | 9056A                  | 2530   | mg/L     | 100 | 1000 | 10/31/18 18:41 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC  | Service Request: K1810468             |
|---------------------------|----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                         | <b>Date Collected:</b> 10/24/18 10:30 |
| Sample Matrix:            | Ground Water                     | Date Received: 10/25/18 14:10         |
| Sample Name:<br>Lab Code: | 053018-CCR-LPLF8<br>K1810468-005 | Basis: NA                             |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 3720   | mg/L  | 5.0 | 1    | 10/31/18 14:57 |   |



# QC Summary Forms

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RIGHT SOLUTIONS | RIGHT PARTNER



## Metals

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

RIGHT SOLUTIONS | RIGHT PARTNER

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K1810468 |
|---------------------------|---------------------------------|---------------------------|
| Project:                  | LPLF CCR                        | Date Collected: NA        |
| Sample Matrix:            | Ground Water                    | Date Received: NA         |
| Sample Name:<br>Lab Code: | Method Blank<br>KQ1815562-02    | Basis: NA                 |

**Total Metals** 

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | ND U   | mg/L  | 0.021 | 1    | 10/30/18 09:53 | 10/26/18       |   |
| Calcium      | 6010C              | ND U   | mg/L  | 0.021 | 1    | 10/30/18 09:53 | 10/26/18       |   |

QA/QC Report

| Client:          | Transalta Centralia Mining, LI | .C               | Servic       | e Request:    | K1810468     |
|------------------|--------------------------------|------------------|--------------|---------------|--------------|
| Project:         | LPLF CCR                       |                  | Date (       | Collected:    | 10/24/18     |
| Sample Matrix:   | Ground Water                   |                  | Date I       | Received:     | 10/25/18     |
|                  |                                |                  | Date A       | Analyzed:     | 10/30/18     |
|                  |                                |                  | Date I       | Extracted:    | 10/26/18     |
|                  |                                | Matrix Spike Sum | mary         |               |              |
|                  |                                | Total Metals     |              |               |              |
| Sample Name:     | 102418-CCR-LPLF7R              |                  |              | Units:        | mg/L         |
| Lab Code:        | K1810468-004                   |                  |              | <b>Basis:</b> | NA           |
| Analysis Method: | 6010C                          |                  |              |               |              |
| Prep Method:     | EPA CLP-METALS ILM04.0         |                  |              |               |              |
|                  |                                | Matrix Spike     |              |               |              |
|                  |                                | KQ1815562-04     |              |               |              |
| Analyte Name     | Sample Result                  | Result           | Spike Amount | % Rec         | % Rec Limits |
| Boron            | 0.340                          | 0.764            | 0.500        | 85            | 75-125       |

203

10.0

66 #

75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

196

Calcium

QA/QC Report

| Client:        | Transalta Centralia | Mining, LLC |                |                  | Service <b>R</b> | Request:      | K18104   | 68        |
|----------------|---------------------|-------------|----------------|------------------|------------------|---------------|----------|-----------|
| Project        | LPLF CCR            |             |                |                  | Date Co          | ollected:     | 10/24/18 | 3         |
| Sample Matrix: | Ground Water        |             |                |                  | Date Ro          | eceived:      | 10/25/18 | 3         |
|                |                     |             |                |                  | Date Ar          | nalyzed:      | 10/30/18 | 3         |
|                |                     | F           | Replicate Samp | ole Summary      |                  |               |          |           |
|                |                     |             | Total M        | letals           |                  |               |          |           |
| Sample Name:   | 102418-CCR-LPLF     | F7R         |                |                  |                  | Units:        | mg/L     |           |
| Lab Code:      | K1810468-004        |             |                |                  |                  | <b>Basis:</b> | NA       |           |
|                |                     |             |                | Duplicate Sample |                  |               |          |           |
|                | Analysis            |             | Sample         | KQ1815562-03     |                  |               |          |           |
| Analyte Name   | Method              | MRL         | Result         | Result           | Average          | RP            | D        | RPD Limit |
| Boron          | 6010C               | 0.021       | 0.340          | 0.342            | 0.341            | <1            |          | 20        |

196

191

194

3

20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

6010C

0.021

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Calcium

QA/QC Report

Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Ground Water

## **Service Request:** K1810468 **Date Analyzed:** 10/30/18

## Lab Control Sample Summary Total Metals

Units:mg/L Basis:NA

## Lab Control Sample

KQ1815562-01

| Analyte Name | <b>Analytical Method</b> | Result | Spike Amount | % Rec | % Rec Limits |
|--------------|--------------------------|--------|--------------|-------|--------------|
| Boron        | 6010C                    | 0.450  | 0.500        | 90    | 80-120       |
| Calcium      | 6010C                    | 11.4   | 12.5         | 91    | 80-120       |



# **General Chemistry**

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

RIGHT SOLUTIONS | RIGHT PARTNER

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: | K1810468 |
|---------------------------|---------------------------------|------------------|----------|
| Project:                  | LPLF CCR                        | Date Collected:  | NA       |
| Sample Matrix:            | Ground Water                    | Date Received:   | NA       |
| Sample Name:<br>Lab Code: | Method Blank<br>K1810468-MB1    | Basis:           | NA       |

| Analyte Name | <b>Analysis Method</b> | Result | Units | MRL  | Dil. | Date Analyzed  | Q |
|--------------|------------------------|--------|-------|------|------|----------------|---|
| Chloride     | 9056A                  | ND U   | mg/L  | 0.10 | 1    | 10/31/18 13:54 |   |
| Fluoride     | 9056A                  | ND U   | mg/L  | 0.20 | 1    | 10/31/18 13:54 |   |
| Sulfate      | 9056A                  | ND U   | mg/L  | 0.10 | 1    | 10/31/18 13:54 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K1810468 |
|---------------------------|---------------------------------|---------------------------|
| Project:                  | LPLF CCR                        | Date Collected: NA        |
| Sample Matrix:            | Ground Water                    | Date Received: NA         |
| Sample Name:<br>Lab Code: | Method Blank<br>K1810468-MB1    | Basis: NA                 |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | ND U   | mg/L  | 5.0 | 1    | 10/29/18 11:07 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K1810468 |
|---------------------------|---------------------------------|---------------------------|
| Project:                  | LPLF CCR                        | Date Collected: NA        |
| Sample Matrix:            | Ground Water                    | Date Received: NA         |
| Sample Name:<br>Lab Code: | Method Blank<br>K1810468-MB2    | Basis: NA                 |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | ND U   | mg/L  | 5.0 | 1    | 10/29/18 11:07 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: | K1810468 |
|---------------------------|---------------------------------|------------------|----------|
| Project:                  | LPLF CCR                        | Date Collected:  | NA       |
| Sample Matrix:            | Ground Water                    | Date Received:   | NA       |
| Sample Name:<br>Lab Code: | Method Blank<br>K1810468-MB3    | Basis:           | NA       |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | ND U   | mg/L  | 5.0 | 1    | 10/31/18 14:57 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K1810468 |
|---------------------------|---------------------------------|---------------------------|
| Project:                  | LPLF CCR                        | Date Collected: NA        |
| Sample Matrix:            | Ground Water                    | Date Received: NA         |
| Sample Name:<br>Lab Code: | Method Blank<br>K1810468-MB4    | Basis: NA                 |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | ND U   | mg/L  | 5.0 | 1    | 10/31/18 14:57 |   |

QA/QC Report

| Client:        | Transalta Centralia Mining, LLC |
|----------------|---------------------------------|
| Project:       | LPLF CCR                        |
| Sample Matrix: | Ground Water                    |

## Service Request:K1810468 Date Collected:10/24/18 Date Received:10/25/18 Date Analyzed:10/31/18

### Duplicate Matrix Spike Summary General Chemistry Parameters

| Sample Name:<br>Lab Code: | 102418-C<br>K1810468 | CR-LPLF7F<br>3-004 | 8      |        |                                |        |                      |                              | J <b>nits:</b> mg/L<br>Basis:NA | ,   |       |
|---------------------------|----------------------|--------------------|--------|--------|--------------------------------|--------|----------------------|------------------------------|---------------------------------|-----|-------|
|                           |                      |                    |        |        | e <b>rix Spike</b><br>468-004M |        | Duplicate<br>K181046 | <b>Matrix Sp</b><br>58-004DM |                                 |     |       |
|                           |                      | Sample             |        | Spike  |                                |        | Spike                |                              | % Rec                           |     | RPD   |
| Analyte Name              | Method               | Result             | Result | Amount | % Rec                          | Result | Amount               | % Rec                        | Limits                          | RPD | Limit |
| Sulfate                   | 9056A                | 1220               | 3260   | 2000   | 102                            | 3190   | 2000                 | 99                           | 90-110                          | 2   | 20    |
| Fluoride                  | 9056A                | ND Ui              | 38.6   | 40.0   | 97                             | 39.5   | 40.0                 | 99                           | 80-120                          | 2   | 20    |
| Chloride                  | 9056A                | 8.4                | 47.6   | 40.0   | 98                             | 47.6   | 40.0                 | 98                           | 80-120                          | <1  | 20    |

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

| Client:<br>Project      | Transalta Centralia Mining,<br>LPLF CCR | LLC       |               |  | Service Reque<br>Date Collecte |            |                  |
|-------------------------|---|-----------|---------------|--|--------------------------------|------------|------------------|
| Sample Matrix:          | Ground Water                            |           |               |  | Date Receive                   | ed: 10/25/ | /18              |
|                         |   |           |               |  | Date Analyz                    | ed: 10/31/ | /18              |
|                         |   | Replica   | te Sample Sun | nmary                                      |                                |            |                  |
|                         |   | General ( | Chemistry Par | ameters                                    |                                |            |                  |
| Sample Name:            | 102418-CCR-LPLF7R                       |           |               |  | Un                             | its: mg/L  |                  |
| Lab Code:               | K1810468-004                            |           |               |  | Ba                             | sis: NA    |                  |
|                         |   |           | Sample        | Duplicate<br>Sample<br>K1810468-<br>004DUP |                                |            |                  |
| Analyte Name            | Analysis Method                         | MRL       | Result        | Result                                     | Average                        | RPD        | <b>RPD</b> Limit |
| Chloride                | 9056A                                   | 1.0       | 8.4           | 8.4  | 8.40                           | <1         | 20               |
| Fluoride                | 9056A                                   | 2.0       | ND Ui         | ND U                                       | NC                             | NC         | 20               |
| Solids, Total Dissolved | SM 2540 C                               | 5.0       | 2430          | 2430                                       | 2430                           | <1         | 5                |
| Sulfate                 | 9056A                                   | 50        | 1220          | 1240                                       | 1230                           | 2          | 20               |

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

|                |                             |         | QA/QC Report   |  |              |             |           |
|----------------|-----------------------------|---------|----------------|--|--------------|-------------|-----------|
| Client:        | Transalta Centralia Mining, | LLC     |                |  | Service Requ | lest: K1810 | )468      |
| Project        | LPLF CCR                    |         |                |  | Date Collec  | ted: 10/24/ | 18        |
| Sample Matrix: | Ground Water                |         |                |  | Date Recei   | ved: 10/25/ | 18        |
|                |                             |         |                |  | Date Analy   | zed: 10/25/ | 18        |
|                |                             | Replica | ate Sample Sun | nmary                                      |              |             |           |
|                |                             | General | Chemistry Par  | ameters                                    |              |             |           |
| Sample Name:   | 102418-CCR-LPLF7R           |         |                |  | U            | nits: pH U  | nits      |
| Lab Code:      | K1810468-004                |         |                |  | В            | asis: NA    |           |
|                |                             |         | Sample         | Duplicate<br>Sample<br>K1810468-<br>004DUP |              |             |           |
| Analyte Name   | Analysis Method             | MRL     | Result         | Result                                     | Average      | RPD         | RPD Limit |
| pН             | SM 4500-H+ B                | -       | 6.46           | 6.48                                       | 6.47         | <1          | 20        |

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Ground Water

## Service Request: K1810468 Date Analyzed: 10/29/18 - 10/31/18

## Lab Control Sample Summary General Chemistry Parameters

Units:mg/L Basis:NA

## Lab Control Sample K1810468-LCS1

| Analyte Name            | Analytical Method | Result | Spike Amount | % Rec | % Rec Limits |
|-------------------------|-------------------|--------|--------------|-------|--------------|
| Chloride                | 9056A             | 4.80   | 5.00         | 96    | 80-120       |
| Fluoride                | 9056A             | 4.70   | 5.00         | 94    | 90-110       |
| Solids, Total Dissolved | SM 2540 C         | 511    | 523          | 98    | 85-115       |
| Sulfate                 | 9056A             | 4.88   | 5.00         | 98    | 90-110       |

QA/QC Report

Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Ground Water

**Service Request:** K1810468 **Date Analyzed:** 10/25/18

## Lab Control Sample Summary General Chemistry Parameters

Units:pH Units Basis:NA

Lab Control Sample K1810468-LCS1

| Analyte Name | Analytical Method | Result | Spike Amount | % Rec | % Rec Limits |
|--------------|-------------------|--------|--------------|-------|--------------|
| pH           | SM 4500-H+ B      | 8.56   | 8.64         | 99    | 85-115       |

QA/QC Report

| Client:<br>Project:<br>Sample Matrix: | Transalta Centralia Mining, LLC<br>LPLF CCR<br>Ground Water |   | Service Requ<br>Date Analyze<br>Date Extract | ed: 10/31/1          |                           |
|---------------------------------------|---|---|--|----------------------|---------------------------|
|                                       |   | Control Sample Summary<br>Solids, Total Dissolved |  |                      |                           |
| Analysis Method:<br>Prep Method:      | SM 2540 C<br>None   |   | Units:<br>Basis:<br>Analysis Lot:            | mg/L<br>NA<br>613152 |                           |
| Sample Name<br>Lab Control Sample     | Lab Code<br>K1810468-LCS2                                   | Result<br>508                                     | Spike<br>Amount<br>523                       | <b>% Rec</b><br>97   | % Rec<br>Limits<br>85-115 |



Service Request No:K1900152

Dennis Morr Transalta Centralia Mining, LLC 913 Big Hanaford Rd Centralia, WA 98531

## Laboratory Results for: LPLF CCR

Dear Dennis,

Enclosed are the results of the sample(s) submitted to our laboratory January 07, 2019. For your reference, these analyses have been assigned our service request number **K1900152**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Elizabeth Harris Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626 PHONE +1 360 577 7222 | FAX +1 360 636 1068 ALS Group USA, Corp. dba ALS Environmental



## Narrative Documents

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

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Page 2 of 31



Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Ground Water

Service Request: K1900152 Date Received: 01/07/2019

## **CASE NARRATIVE**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS).

#### Sample Receipt:

Two ground water samples were received for analysis at ALS Environmental on 01/07/2019. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### <u>Metals:</u>

No significant anomalies were noted with this analysis.

#### General Chemistry:

No significant anomalies were noted with this analysis.

| Approved by | El Din | Date | 01/11/2019 |
|-------------|--------|------|------------|
|             | 8      | _    |            |



## SAMPLE DETECTION SUMMARY

| CLIENT ID: 010719-CCR-LPLF2R |         |      |         |          |       |           |
|------------------------------|---------|------|---------|----------|-------|-----------|
| Analyte                      | Results | Flag | MDL     | MRL      | Units | Method    |
| Solids, Total Dissolved      | 3320    |      |         | 5.0      | mg/L  | SM 2540 C |
| Sulfate                      | 1630    |      |         | 50       | mg/L  | 9056A     |
| Boron                        | 0.332   |      |         | 0.021    | mg/L  | 6010C     |
| Calcium                      | 456     |      |         | 0.021    | mg/L  | 6010C     |
| CLIENT ID: 010719-CCR-LPLF7R |         | Lab  | D: K190 | 0152-002 |       |           |
| Analyte                      | Results | Flag | MDL     | MRL      | Units | Method    |
| Chloride                     | 9.23    |      |         | 0.20     | mg/L  | 9056A     |



## Sample Receipt Information

ALS Environmental—Kelso Laboratory 1317 South 13th Avenue, Kelso, WA 98626 Phone (360) 577-7222 Fax (360) 425-9096 www.alsglobal.com

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## SAMPLE CROSS-REFERENCE

| SAMPLE #     | CLIENT SAMPLE ID  | DATE     | <u>TIME</u> |
|--------------|-------------------|----------|-------------|
| K1900152-001 | 010719-CCR-LPLF2R | 1/7/2019 | 1415        |
| K1900152-002 | 010719-CCR-LPLF7R | 1/7/2019 | 1455        |



ADDRESS 1317 South 13th Ave., Kelso, WA 98626 PHONE 1 360 577 7222 FAX 1 360 636 1068

K1900152

Work Order No.: 80819

Chain of Custody

Part of the ALS Group A Campbell Brothers Limited Company

| Project Manager: Bill Sche            |                 | p A Campber                                   |                 | inited Con  | трану           |               |                 |                   |                 | T            | Bil)             | tor              |                       |                | Rill                                     | Sche           | or            |          |       |             |   |                            |                                      |
|---------------------------------------|-----------------|---|-----------------|-------------|-----------------|---------------|-----------------|-------------------|-----------------|--------------|------------------|------------------|-----------------------|----------------|--|----------------|---------------|----------|-------|-------------|---|----------------------------|--------------------------------------|
|                                       |                 | Mining Com                                    | oanv            |             |                 |               |                 |                   |                 | 1            |                  | npan             | <b>v:</b>             |                | TransAlta Centralia Mining               |                |               |          |       |             |   |                            |                                      |
|                                       | Hanaford F      |   |                 |             |                 |               |                 |                   |                 | 1            |                  | dress            |                       |                |  |                | Hanafor       |          |       | <del></del> |   |                            |                                      |
|                                       | , WA 9853       |   |                 |             |                 |               |                 |                   |                 | 1            |                  | , Sta            |                       | <b>P:</b>      |  |                | a, WA 98      |          |       |             |   |                            |                                      |
|                                       | er@transa       |   |                 | Phone:      | 360             | )-33(         | 0-23            | 32                | - 4.4           |              | Em               |                  |                       |                |  |                | er@trans      |          | om    |             | po#   |                            |                                      |
| Project Name: LPLF CC                 | R               |   |                 |             |                 |               |                 |                   |                 |              |                  | RE               | QUE                   | STE            | D AN                                     | ALY            | 'SIS          |          | 933N  |             |   |                            | TAT                                  |
| Project Number:                       |                 |   |                 |             |                 |               |                 |                   |                 |              |                  |                  |                       |                |  |                |               |          |       |             |   |                            | Routine 21day                        |
| P.O. Number: 470007                   | 5456 Line       | 90  |                 |             |                 |               |                 |                   |                 |              |                  |                  |                       | 1              |  |                |               |          |       |             |   |                            | Same Day 100%                        |
| Sampler's Name: Bill Sche             | er              |   |                 |             |                 |               |                 |                   |                 |              |                  |                  |                       |                |  | 1              |               |          |       |             |   |                            | Next Day ***                         |
| S                                     | AMPLE RI        | ECEIPT  |                 |             |                 |               |                 |                   |                 |              |                  | 1                |                       |                |  |                |               |          |       |             |   |                            | 3 Day                                |
| Temperature ('C):                     |                 | Temp Bla                                      | nk Present      |             |                 |               |                 |                   |                 |              |                  |                  |                       |                |  |                |               |          |       |             |   | 5 Day 50%                  |                                      |
| Received Intact:                      | Yes             | No N/A  | Wet Ice /       | Blue Ice    |                 |               |                 |                   |                 |              |                  |                  |                       |                |  |                |               |          |       |             |   |                            | Surcharges.                          |
| Cooler Custody Seals:                 | Yes             | No N/A  | Total Con       | tainers:    |                 |               |                 | 228               |                 |              |                  | 1                |                       | -              | <b>-</b>                                 |                |               |          |       |             |   |                            | Please call for                      |
| Sample Custody Seals:                 | Yes             | No N/A  |                 | ········    | iers            |               | Hd              |                   | S               |              | e                |                  |                       |                |  | 226            |               |          |       |             |   |                            | availability                         |
| Sample Identification                 | Matrix          | Date<br>Sampled                               | Time<br>Sampled | Lab ID      | No. of Containe |               | SM 4500-H + B / | 904.0 / Radium    | SM 2540 C / TDS | 7470A / Hg T | 9056A / Chloride | 9056A / F        | 9056A / SO4           | 6010C / Metals | 6020A / Metals T                         | 903.0 Radium 2 |               |          |       |             |   |                            | Due Date:                            |
| 010719-CCR-LPLF2R                     | GW              | 01/07/2019                                    | 14:15           |             | 3               |               | S               | ō.                | X               | Ň            | ð                | <u></u> <u>क</u> | т<br>Т                | ق<br>X         | б<br>Х                                   | ð              |               |          |       |             |   |                            | Comments                             |
| 010719-CCR-LPLF7R                     | GW              | 01/07/2019                                    | 14:55           |             | 1               |               |                 |                   | <u> </u> ^      |              | x                |                  | ^                     | ^              |  |                |               |          |       |             |   |                            | Boron and Calcium needed<br>Chloride |
|                                       |                 | 01/07/2018                                    | 14.55           |             | "               |               |                 |                   |                 |              | <u> </u>         |                  |                       |                |  |                |               |          |       |             |   |                            | Chloride                             |
|                                       |                 |   |                 |             |                 |               |                 |                   |                 |              |                  |                  |                       |                |  |                |               |          |       |             |   | +                          |                                      |
|                                       |                 | 1   |                 |             |                 |               |                 |                   |                 |              |                  |                  |                       |                |  |                |               |          |       |             | +   | +                          |                                      |
|                                       |                 |   |                 |             |                 |               |                 |                   |                 |              |                  |                  |                       |                |  |                |               |          |       |             |   |                            |                                      |
|                                       |                 |   |                 |             |                 |               |                 |                   |                 |              |                  |                  |                       |                |  |                |               |          |       |             |   |                            |                                      |
|                                       |                 |   |                 |             |                 |               |                 |                   |                 |              |                  |                  |                       |                |  |                |               |          |       |             |   |                            |                                      |
|                                       |                 |   |                 |             |                 |               |                 |                   |                 |              | <b></b>          |                  |                       |                |  |                |               |          |       |             |   |                            |                                      |
|                                       |                 |   |                 | -           |                 |               |                 |                   |                 |              |                  |                  |                       |                |  |                |               |          |       | _           |   |                            |                                      |
| · · · · · · · · · · · · · · · · · · · |                 |   | ·5              |             |                 |               | ——I             |                   |                 |              |                  |                  |                       |                |  |                |               |          |       |             |   | +                          |                                      |
| Dissolved                             | <br>            | <u>                                      </u> | a Re Ca Cd      |             | Ca F            |               |                 | α M               | n Ma            | No.          | Ni               | p ph             | Sh                    | <u>د</u> م د   | j Sn                                     | <u></u>        | <br>  \/ 7n 7 | <u> </u> |       | 100         |   |                            | Methods Available                    |
| Total                                 |                 | g, Al, As, B, B<br>g, Al, As, B, B            |                 |             |                 |               |                 |                   |                 |              |                  |                  |                       |                |  |                |               |          |       | $\neg$      | wull  | an dhail an chuir an       | on Request                           |
| <u> </u>                              |                 | LINQUISH                                      |                 | <u>,,</u> , | <b>-u</b> , r   | <b>c</b> , n, | ı¥!<br>ا¥ا      | A <sup>1</sup> MI | II, IVIU        | , INA,       | 141,             |                  | JU,                   | JC, J          | ı, JII,                                  | ו, וכ          | REC           |          | DR    | _⊥<br>Y     |   | ~ M.                       |                                      |
| Print Name                            | <u> </u>        |   | gnature         |             |                 | Da            | te/Ti           | me                |                 |              |                  | P                | rint                  | Nam            | e  |                |               |          | Signa |             | e   | <u>enitari</u><br>Distanti | Date/Time                            |
| William Scheer                        | annan istaal di | IAMA /  |                 |             | 017             | data tanàn    | 2019            | 2012/2012/2012    | o nggajadi      | uniethiliji  | <u> </u>         | 1<br>11          | <u>aasittii</u><br>][ | 27 /           | an a | -<br>-         |               | 5        | 7     |             | <u>nettennen</u>  | <u></u>                    | 1-7 B Harr                           |
|                                       |                 | VVW L   |                 | )           |                 |               | -019            |                   | -               |              | 2                |                  |                       |                | /  |                |               | Jun      | · ··· | ola MA      | and and and a second |                            | 11-111-009                           |
|                                       |                 |   |                 |             |                 |               |                 |                   |                 |              |                  |                  |                       |                |  |                | Comment       |          |       |             |   |                            |                                      |



| (ALS)   | PC  | 7                    | ha    |  |  |  |  |  |  |  |
|---|---|----------------------|-------|--|--|--|--|--|--|--|
| Cooler Receipt and Preservation Form  | 1   |                      |       |  |  |  |  |  |  |  |
| Client Service Request K19 $OO(1)$  | 52  |                      | )     |  |  |  |  |  |  |  |
| Received: $179$ Opened: $719$ By: Unloaded: $779$   | <u>,                                     </u> | )                    |       |  |  |  |  |  |  |  |
|   | By  |                      |       |  |  |  |  |  |  |  |
| 1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Deliver  | ed  |                      |       |  |  |  |  |  |  |  |
| 2. Samples were received in: (circle) Cooler Box Envelope Other N   |   |                      |       |  |  |  |  |  |  |  |
| 3. Were <u>custody seals</u> on coolers? NA Y (N) If yes, how many and where?   |   |                      |       |  |  |  |  |  |  |  |
| If present, were custody seals intact? Y N If present, were they signed and dated?  |   | Y                    | N     |  |  |  |  |  |  |  |
| Raw<br>Cooler Temp         Corrected.<br>Cooler Temp         Raw<br>Temp Blank         Corrected<br>Temp Blank         Corr.         Thermometer         Cooler/COC ID         Tracking | Number  |                      | an di |  |  |  |  |  |  |  |
| Cooler Temp     Cooler Temp     Temp Blank     Temp Blank     Factor     ID       0.5     0.4     -     -     -     0.4     3497  |   |                      | Filed |  |  |  |  |  |  |  |
|   |   |                      |       |  |  |  |  |  |  |  |
|   |   |                      |       |  |  |  |  |  |  |  |
|   |   |                      |       |  |  |  |  |  |  |  |
| 4. Packing material: Inserts Baggies Bubble Wear Cal Packa West Los De La St  |   |                      |       |  |  |  |  |  |  |  |
| Buoble Whip Gerrucks Werre Dry Ice Sleeves  |   |                      |       |  |  |  |  |  |  |  |
| the same of puppers property med out (ink, signed, etc.)?   | NA  | $(\mathbf{y})$       | Ν     |  |  |  |  |  |  |  |
| in good condition (temperature, unoroken)? Indicate in the table below.   | NA  | Y                    | Ν     |  |  |  |  |  |  |  |
| If applicable, tissue samples were received:       Frozen       Partially Thawed       Thawed         7. Were all sample labels complete (i.e analysis, preservation, etc.)?            | NA  | ()                   | N     |  |  |  |  |  |  |  |
| 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2.   | NA  | $\tilde{\mathbf{v}}$ | N     |  |  |  |  |  |  |  |
| 9. Were appropriate bottles/containers and volumes received for the tests indicated?  | NA  | Ú<br>ÚV              | N     |  |  |  |  |  |  |  |
| 10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below   | NA  | $\mathcal{O}$        | N     |  |  |  |  |  |  |  |
| 11. Were VOA vials received without headspace? Indicate in the table below.   |   | Y                    | N     |  |  |  |  |  |  |  |
| 12. Was C12/Res negative?   | (NA)  | Ŷ                    | N     |  |  |  |  |  |  |  |
|   | $\underline{\mathbb{C}}$                      | -                    |       |  |  |  |  |  |  |  |
| Sample ID on Bottle Sample ID on COC Identified b   | <u>r:</u>                                     |                      |       |  |  |  |  |  |  |  |
|   |   |                      |       |  |  |  |  |  |  |  |
|   |   |                      |       |  |  |  |  |  |  |  |
|   |   |                      |       |  |  |  |  |  |  |  |

| Sample ID | Bottle Count<br>Bottle Type            | Out of<br>Temp | Head-<br>space | Broke | pH | Reagent | Volume<br>added | Reagent Lot<br>Number | Initials | Time |
|-----------|--|----------------|----------------|-------|----|---------|-----------------|-----------------------|----------|------|
|           | ······                                 |                |                |       |    | <br>    |                 |                       |          |      |
|           |  |                |                |       |    |         |                 |                       |          |      |
|           | ······································ |                |                |       |    |         |                 |                       |          | ·    |
|           |  |                |                |       |    |         |                 | AND MEY               |          |      |

## Notes, Discrepancies, & Resolutions:

|         |    | (Charlen of | 1. A. S. 184 | 202305 | 1000 |      | (maintain) | M  | <b>MIK</b> |
|---------|----|-------------|--------------|--------|------|------|------------|----|------------|
|         |    |             |              |        |      | 600  |            |    |            |
|         |    | 2           |              |        | A.   | C.S  |            |    |            |
| 7/25/16 | 40 | ontoi       | ver          | 5 3    | Tor  | -601 | , N        | ot | 3,         |

IMAP **A** ĽÆ

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## **Miscellaneous Forms**

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#### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

#### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- $i \,$   $\,$  The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
   DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

#### Additional Petroleum Hydrocarbon Specific Qualifiers

- ${f F}$  The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

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## ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso State Certifications, Accreditations, and Licenses

| Agency                   | Web Site   | Number      |
|--------------------------|--|-------------|
| Alaska DEH               | http://dec.alaska.gov/eh/lab/cs/csapproval.htm   | UST-040     |
| Arizona DHS              | http://www.azdhs.gov/lab/license/env.htm   | AZ0339      |
| Arkansas - DEQ           | sas - DEQ http://www.adeq.state.ar.us/techsvs/labcert.htm  |             |
| California DHS (ELAP)    | ) http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx  |             |
| DOD ELAP                 | http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm   | L16-58-R4   |
| Florida DOH              | http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm  | E87412      |
| Hawaii DOH               | http://health.hawaii.gov/  | -           |
| ISO 17025                | http://www.pjlabs.com/   | L16-57      |
| Louisiana DEQ            | http://www.deq.louisiana.gov/page/la-lab-accreditation   | 03016       |
| Maine DHS                | http://www.maine.gov/dhhs/   | WA01276     |
| Minnesota DOH            | http://www.health.state.mn.us/accreditation  | 053-999-457 |
| Nevada DEP               | http://ndep.nv.gov/bsdw/labservice.htm   | WA01276     |
| New Jersey DEP           | http://www.nj.gov/dep/enforcement/oqa.html   | WA005       |
| New York - DOH           | https://www.wadsworth.org/regulatory/elap  | 12060       |
| North Carolina DEQ       | https://deq.nc.gov/about/divisions/water-resources/water-resources-<br>data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-<br>certification | 605         |
| Oklahoma DEQ             | http://www.deq.state.ok.us/CSDnew/labcert.htm  | 9801        |
| Oregon – DEQ (NELAP)     | http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaborator<br>yAccreditation/Pages/index.aspx   | WA100010    |
| South Carolina DHEC      | http://www.scdhec.gov/environment/EnvironmentalLabCertification/   | 61002       |
| Texas CEQ                | http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html  | T104704427  |
| Washington DOE           | http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html   | C544        |
| Wyoming (EPA Region 8)   | https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-  | -           |
| Kelso Laboratory Website | www.alsglobal.com<br>to our laboratory's NELAP-approved quality assurance program. A complete  | NA          |

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

## Acronyms

| ASTM       | American Society for Testing and Materials  |
|------------|---|
| A2LA       | American Association for Laboratory Accreditation   |
| CARB       | California Air Resources Board  |
| CAS Number | Chemical Abstract Service registry Number   |
| CFC        | Chlorofluorocarbon  |
| CFU        | Colony-Forming Unit   |
| DEC        | Department of Environmental Conservation  |
| DEQ        | Department of Environmental Quality   |
| DHS        | Department of Health Services   |
| DOE        | Department of Ecology   |
| DOH        | Department of Health  |
| EPA        | U. S. Environmental Protection Agency   |
| ELAP       | Environmental Laboratory Accreditation Program  |
| GC         | Gas Chromatography  |
| GC/MS      | Gas Chromatography/Mass Spectrometry  |
| LOD        | Limit of Detection  |
| LOQ        | Limit of Quantitation   |
| LUFT       | Leaking Underground Fuel Tank   |
| M<br>MCL   | Modified<br>Maximum Contaminant Level is the highest permissible concentration of a substance<br>allowed in drinking water as established by the USEPA. |
| MDL        | Method Detection Limit  |
| MPN        | Most Probable Number  |
| MRL        | Method Reporting Limit  |
| NA         | Not Applicable  |
| NC         | Not Calculated  |
| NCASI      | National Council of the Paper Industry for Air and Stream Improvement   |
| ND         | Not Detected  |
| NIOSH      | National Institute for Occupational Safety and Health   |
| PQL        | Practical Quantitation Limit  |
| RCRA       | Resource Conservation and Recovery Act  |
| SIM        | Selected Ion Monitoring   |
| TPH<br>tr  | Total Petroleum Hydrocarbons<br>Trace level is the concentration of an analyte that is less than the PQL but greater than or<br>equal to the MDL.       |

Analyst Summary report

# Client:Transalta Centralia Mining, LLCProject:LPLF CCR/

010719-CCR-LPLF2R

K1900152-001

Ground Water

Sample Name:

Sample Matrix:

Lab Code:

#### Service Request: K1900152

**Date Collected:** 01/7/19 **Date Received:** 01/7/19

| <b>Analysis Method</b><br>6010C<br>9056A<br>SM 2540 C |   | Extracted/Digested By<br>JHINSON | <b>Analyzed By</b><br>AMCKORNEY<br>MRODRIGUEZ<br>JMADISON       |
|---|---|----------------------------------|---|
| Sample Name:<br>Lab Code:<br>Sample Matrix:           | 010719-CCR-LPLF7R<br>K1900152-002<br>Ground Water |                                  | <b>Date Collected:</b> 01/7/19<br><b>Date Received:</b> 01/7/19 |
| <b>Analysis Method</b><br>9056A                       |   | Extracted/Digested By            | <b>Analyzed By</b><br>MRODRIGUEZ                                |



# Sample Results

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# Metals

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Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1900152             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 01/07/19 14:15 |
| Sample Matrix:            | Ground Water                      | Date Received: 01/07/19 16:05         |
| Sample Name:<br>Lab Code: | 010719-CCR-LPLF2R<br>K1900152-001 | Basis: NA                             |

**Total Metals** 

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | 0.332  | mg/L  | 0.021 | 1    | 01/09/19 14:19 | 01/08/19       |   |
| Calcium      | 6010C              | 456    | mg/L  | 0.021 | 1    | 01/09/19 14:19 | 01/08/19       |   |



# **General Chemistry**

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Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1900152             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 01/07/19 14:15 |
| Sample Matrix:            | Ground Water                      | Date Received: 01/07/19 16:05         |
| Sample Name:<br>Lab Code: | 010719-CCR-LPLF2R<br>K1900152-001 | Basis: NA                             |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | 3320   | mg/L  | 5.0 | 1    | 01/08/19 01:50 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1900152             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 01/07/19 14:15 |
| Sample Matrix:            | Ground Water                      | Date Received: 01/07/19 16:05         |
| Sample Name:<br>Lab Code: | 010719-CCR-LPLF2R<br>K1900152-001 | Basis: NA                             |

| Analyte Name | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|--------------|-----------------|--------|-------|-----|------|----------------|---|
| Sulfate      | 9056A           | 1630   | mg/L  | 50  | 500  | 01/09/19 13:57 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC   | Service Request: K1900152             |
|---------------------------|-----------------------------------|---------------------------------------|
| Project:                  | LPLF CCR                          | <b>Date Collected:</b> 01/07/19 14:55 |
| Sample Matrix:            | Ground Water                      | Date Received: 01/07/19 16:05         |
| Sample Name:<br>Lab Code: | 010719-CCR-LPLF7R<br>K1900152-002 | Basis: NA                             |

|              | Analysis |        |       |      |      |                |   |
|--------------|----------|--------|-------|------|------|----------------|---|
| Analyte Name | Method   | Result | Units | MRL  | Dil. | Date Analyzed  | Q |
| Chloride     | 9056A    | 9.23   | mg/L  | 0.20 | 2    | 01/09/19 13:30 |   |



# QC Summary Forms

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# Metals

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Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K1900152 |
|---------------------------|---------------------------------|---------------------------|
| Project:                  | LPLF CCR                        | Date Collected: NA        |
| Sample Matrix:            | Ground Water                    | Date Received: NA         |
| Sample Name:<br>Lab Code: | Method Blank<br>KQ1900246-02    | Basis: NA                 |

**Total Metals** 

| Analyte Name | Analysis<br>Method | Result | Units | MRL   | Dil. | Date Analyzed  | Date Extracted | Q |
|--------------|--------------------|--------|-------|-------|------|----------------|----------------|---|
| Boron        | 6010C              | ND U   | mg/L  | 0.021 | 1    | 01/09/19 14:15 | 01/08/19       |   |
| Calcium      | 6010C              | ND U   | mg/L  | 0.021 | 1    | 01/09/19 14:15 | 01/08/19       |   |

QA/QC Report

| Client:          | Transalta Centralia Mining, Ll | LC              | Service      | <b>Request:</b> | K1900152     |
|------------------|--------------------------------|-----------------|--------------|-----------------|--------------|
| Project:         | LPLF CCR                       |                 | Date Co      | ollected:       | 01/07/19     |
| Sample Matrix:   | Ground Water                   |                 | Date R       | eceived:        | 01/07/19     |
|                  |                                |                 | Date A       | nalyzed:        | 01/9/19      |
|                  |                                |                 | Date Ex      | stracted:       | 01/8/19      |
|                  |                                | Matrix Spike Su | immary       |                 |              |
|                  |                                | Total Meta      | ·            |                 |              |
| Sample Name:     | 010719-CCR-LPLF2R              |                 |              | Units:          | mg/L         |
| Lab Code:        | K1900152-001                   |                 |              | Basis:          | NA           |
| Analysis Method: | 6010C                          |                 |              |                 |              |
| Prep Method:     | EPA CLP ILM04.0                |                 |              |                 |              |
|                  |                                | Matrix Spike    |              |                 |              |
|                  |                                | KQ1900246-04    |              |                 |              |
| Analyte Name     | Sample Result                  | Result          | Spike Amount | % Rec           | % Rec Limits |

0.728

464

0.500

10.0

79

81 #

75-125

75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

0.332

456

Boron

Calcium

QA/QC Report

| Client:               | Transalta Centralia | Mining, LLC |                  |                        | Service <b>F</b> | Request: ]    | K19001:  | 52        |
|-----------------------|---------------------|-------------|------------------|------------------------|------------------|---------------|----------|-----------|
| Project               | LPLF CCR            |             |                  |                        | Date Co          | ollected: (   | 01/07/19 | )         |
| Sample Matrix:        | Ground Water        |             |                  |                        | Date R           | eceived: (    | 01/07/19 | )         |
|                       |                     |             |                  |                        | Date Ar          | nalyzed: (    | 01/09/19 | )         |
|                       |                     | F           | Replicate Samp   | ole Summary            |                  |               |          |           |
|                       |                     |             | Total M          | letals                 |                  |               |          |           |
| Sample Name:          | 010719-CCR-LPLF     | F2R         |                  |                        |                  | Units:        | mg/L     |           |
| Lab Code:             | K1900152-001        |             |                  |                        |                  | <b>Basis:</b> | NA       |           |
|                       | A I                 |             | <b>C</b>         | Duplicate Sample       |                  |               |          |           |
| Analyta Nama          | Analysis<br>Method  | MRL         | Sample<br>Result | KQ1900246-03<br>Result | Average          | RPI           | <b>`</b> | RPD Limit |
| Analyte Name<br>Boron | 6010C               | 0.021       | 0.332            | 0.326                  | 0.329            | 2             | <b>,</b> | 20        |

456

460

458

<1

20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

6010C

0.021

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Calcium

QA/QC Report

Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Ground Water

## **Service Request:** K1900152 **Date Analyzed:** 01/09/19

## Lab Control Sample Summary Total Metals

Units:mg/L Basis:NA

## Lab Control Sample

KQ1900246-01

| Analyte Name | <b>Analytical Method</b> | Result | Spike Amount | % Rec | % Rec Limits |
|--------------|--------------------------|--------|--------------|-------|--------------|
| Boron        | 6010C                    | 0.431  | 0.500        | 86    | 80-120       |
| Calcium      | 6010C                    | 11.4   | 12.5         | 91    | 80-120       |



# **General Chemistry**

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Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: K1900152 |  |
|---------------------------|---------------------------------|---------------------------|--|
| Project:                  | LPLF CCR                        | Date Collected: NA        |  |
| Sample Matrix:            | Ground Water                    | Date Received: NA         |  |
| Sample Name:<br>Lab Code: | Method Blank<br>K1900152-MB     | Basis: NA                 |  |

| Analyte Name | Analysis Method | Result | Units | MRL  | Dil. | Date Analyzed  | Q |
|--------------|-----------------|--------|-------|------|------|----------------|---|
| Chloride     | 9056A           | ND U   | mg/L  | 0.10 | 1    | 01/09/19 10:09 |   |
| Sulfate      | 9056A           | ND U   | mg/L  | 0.10 | 1    | 01/09/19 10:09 |   |

Analytical Report

| Client:                   | Transalta Centralia Mining, LLC | Service Request: | K1900152 |
|---------------------------|---------------------------------|------------------|----------|
| Project:                  | LPLF CCR                        | Date Collected:  | NA       |
| Sample Matrix:            | Ground Water                    | Date Received:   | NA       |
| Sample Name:<br>Lab Code: | Method Blank<br>K1900152-MB     | Basis: 1         | NA       |

| Analyte Name            | Analysis Method | Result | Units | MRL | Dil. | Date Analyzed  | Q |
|-------------------------|-----------------|--------|-------|-----|------|----------------|---|
| Solids, Total Dissolved | SM 2540 C       | ND U   | mg/L  | 5.0 | 1    | 01/08/19 01:50 |   |

|                         |                            |        | QA/QC Repor     | t  |              |                     |                  |
|-------------------------|----------------------------|--------|-----------------|--|--------------|---------------------|------------------|
| Client:                 | Transalta Centralia Mining | g, LLC |                 |  | Service Requ | uest: K190          | 0152             |
| Project                 | LPLF CCR                   |        |                 |  | Date Collec  | cted: 01/07         | /19              |
| Sample Matrix:          | Ground Water               |        |                 |  | Date Recei   | <b>ved:</b> 01/07   | /19              |
|                         |                            |        |                 |  | Date Analy   | zed: 01/08          | /19              |
|                         |                            | Repli  | icate Sample St | ımmary                                     |              |                     |                  |
|                         |                            | Genera | al Chemistry Pa | arameters                                  |              |                     |                  |
| Sample Name:            | 010719-CCR-LPLF2R          |        |                 |  | Ŭ            | J <b>nits:</b> mg/L |                  |
| Lab Code:               | K1900152-001               |        |                 |  | В            | Basis: NA           |                  |
|                         |                            |        | Sample          | Duplicate<br>Sample<br>K1900152-<br>001DUP |              |                     |                  |
| Analyte Name            | Analysis Method            | MRL    | Result          | Result                                     | Average      | RPD                 | <b>RPD</b> Limit |
| Solids, Total Dissolved | SM 2540 C                  | 5.0    | 3320            | 3450                                       | 3380         | 4                   | 5                |

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:Transalta Centralia Mining, LLCProject:LPLF CCRSample Matrix:Ground Water

## Service Request: K1900152 Date Analyzed: 01/08/19 - 01/09/19

## Lab Control Sample Summary General Chemistry Parameters

Units:mg/L Basis:NA

### Lab Control Sample K1900152-LCS

| Analyte Name            | <b>Analytical Method</b> | Result | Spike Amount | % Rec | % Rec Limits |
|-------------------------|--------------------------|--------|--------------|-------|--------------|
| Chloride                | 9056A                    | 4.97   | 5.00         | 99    | 80-120       |
| Solids, Total Dissolved | SM 2540 C                | 510    | 523          | 97    | 85-115       |
| Sulfate                 | 9056A                    | 5.13   | 5.00         | 103   | 90-110       |