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

January 2019

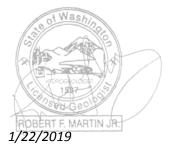


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## Acronyms and Abbreviations

°C	degrees Celsius
CCR	coal combustion residuals
CCR SAP	Groundwater Monitoring Sampling and Analysis Plan for the Limited Purpose Landfill 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 Type/Purpose	Date Completed	Appendix III, Detection 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

CH2M HILL Engineers, Inc. (CH2M). 2011b. *TransAlta Centralia Mining Fourth Quarter 2010 Groundwater Monitoring Report.* 

CH2M HILL Engineers, Inc. (CH2M). 2016a. Groundwater Monitoring Well Construction Data Report for the Limited Purpose Landfill at the TransAlta Centralia Mining LLC Site.

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

CH2M HILL Engineers, Inc. (CH2M). 2017a. Coal Combustion Residual Groundwater Monitoring System Certification for the Limited Purpose Landfill at the Centralia Mine Site near Centralia, Washington.

CH2M HILL Engineers, Inc. (CH2M). 2017b. Coal Combustion Residual Statistical Method Certification for the Limited Purpose Landfill at the Centralia Mine near Centralia, Washington.

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

U.S. Environmental Protection Agency (EPA). 2002. *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers*.

U.S. Environmental Protection Agency (EPA). 2009. Unified Guidance: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities.

U.S. Environmental Protection Agency (EPA). 2016. *National Functional Guidelines for Inorganic Superfund Methods Data Review.* 

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 Prediction Levels	Upper Prediction Levels		Calculated Upper Prediction Limits (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

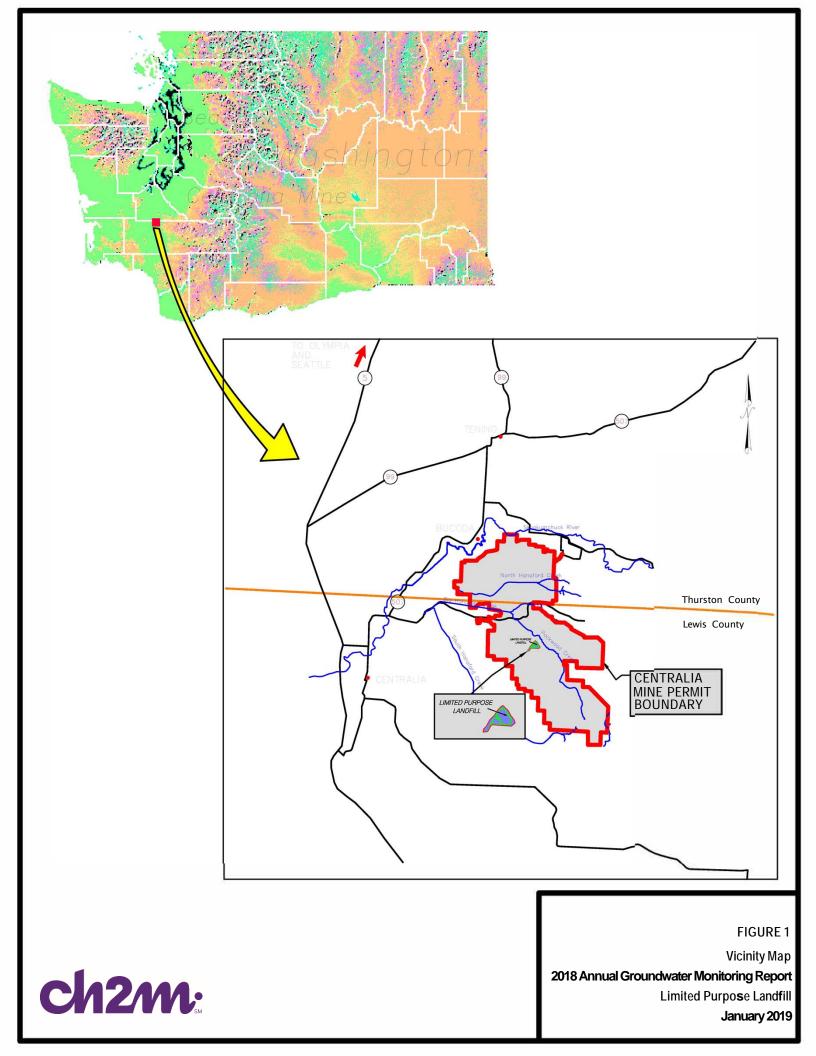
Four results were retested from 5/30/2018 sampling event

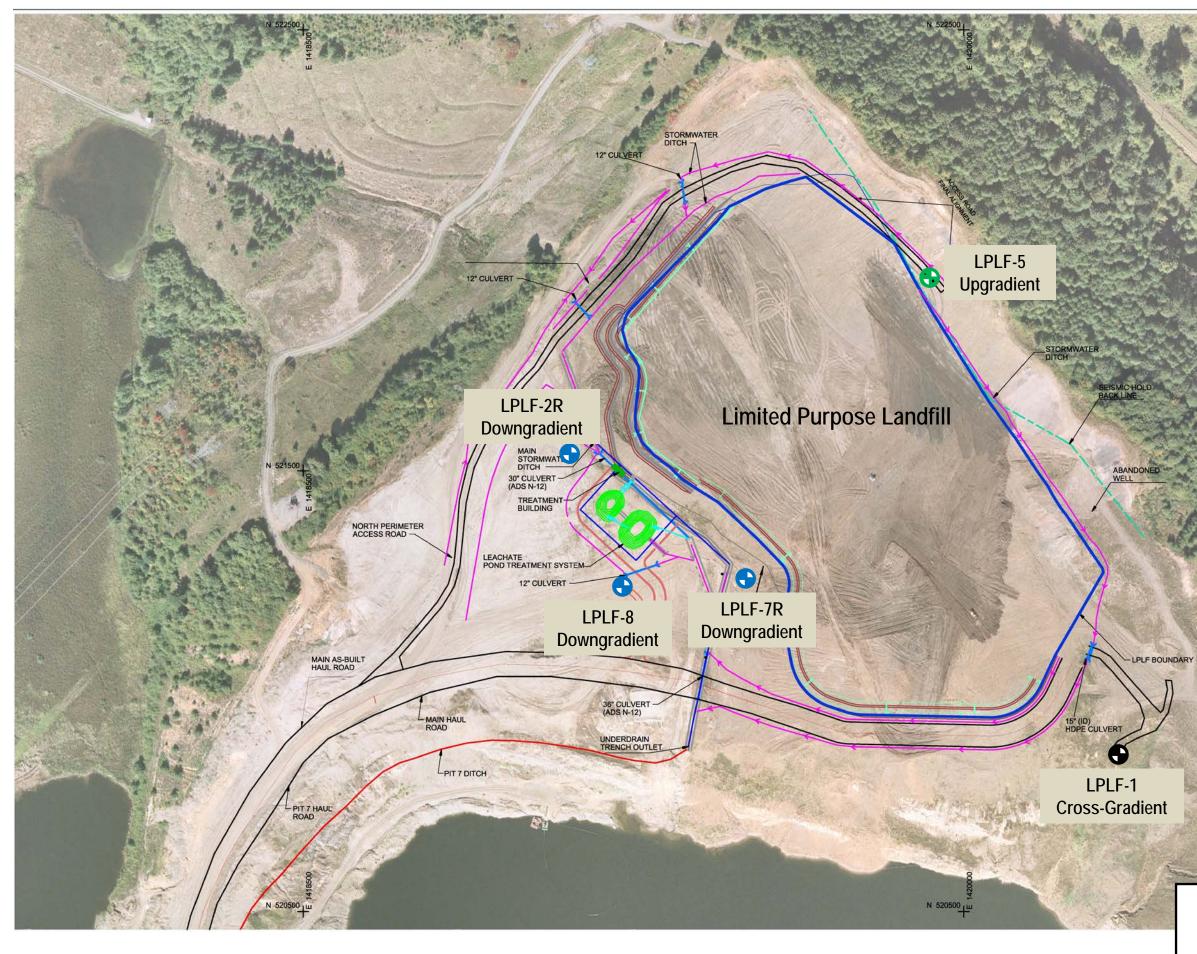
Three retests results (highlighted yellow) were confirmed as statistically-significant exceedances for evaluation.

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

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

## Figures





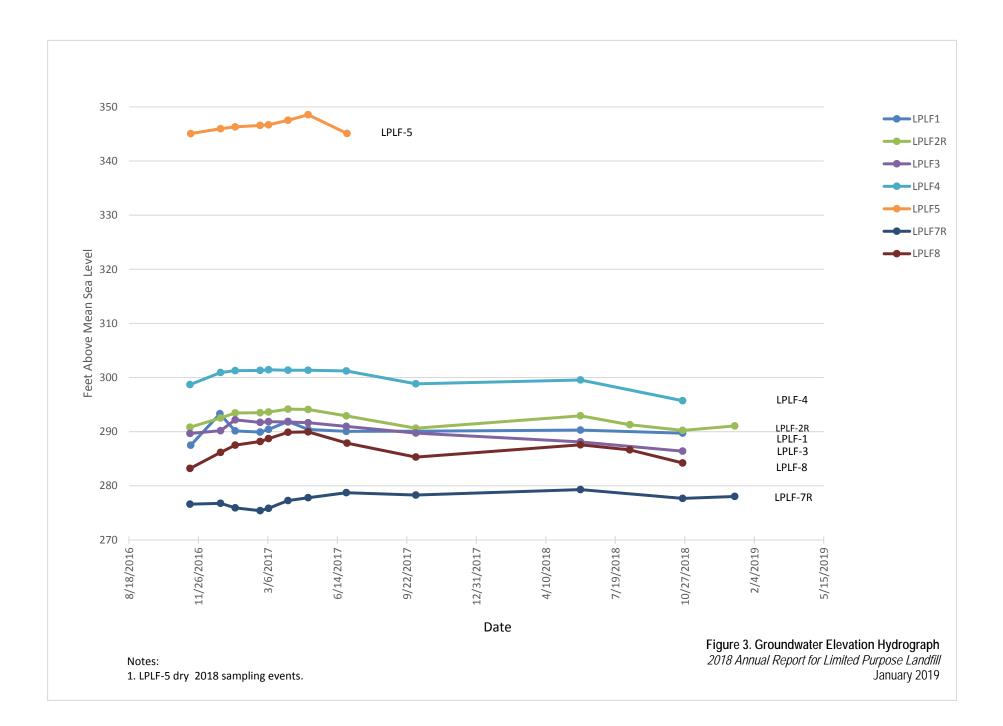
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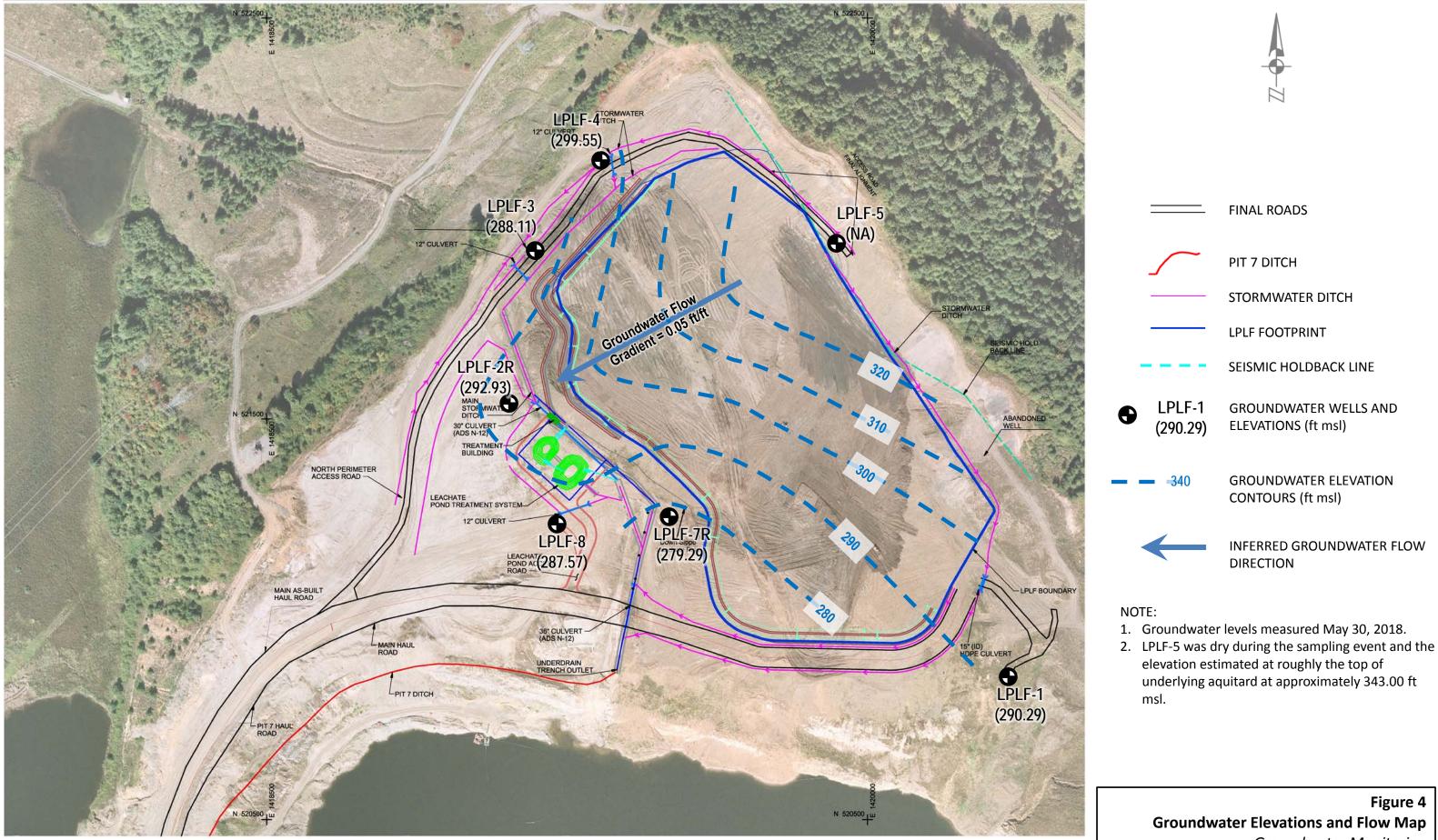


0

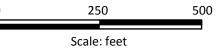


Figure 2 Site Map and Groundwater Monitoring Network 2018 Annual Report for Limited Purpose Landfill January 2019

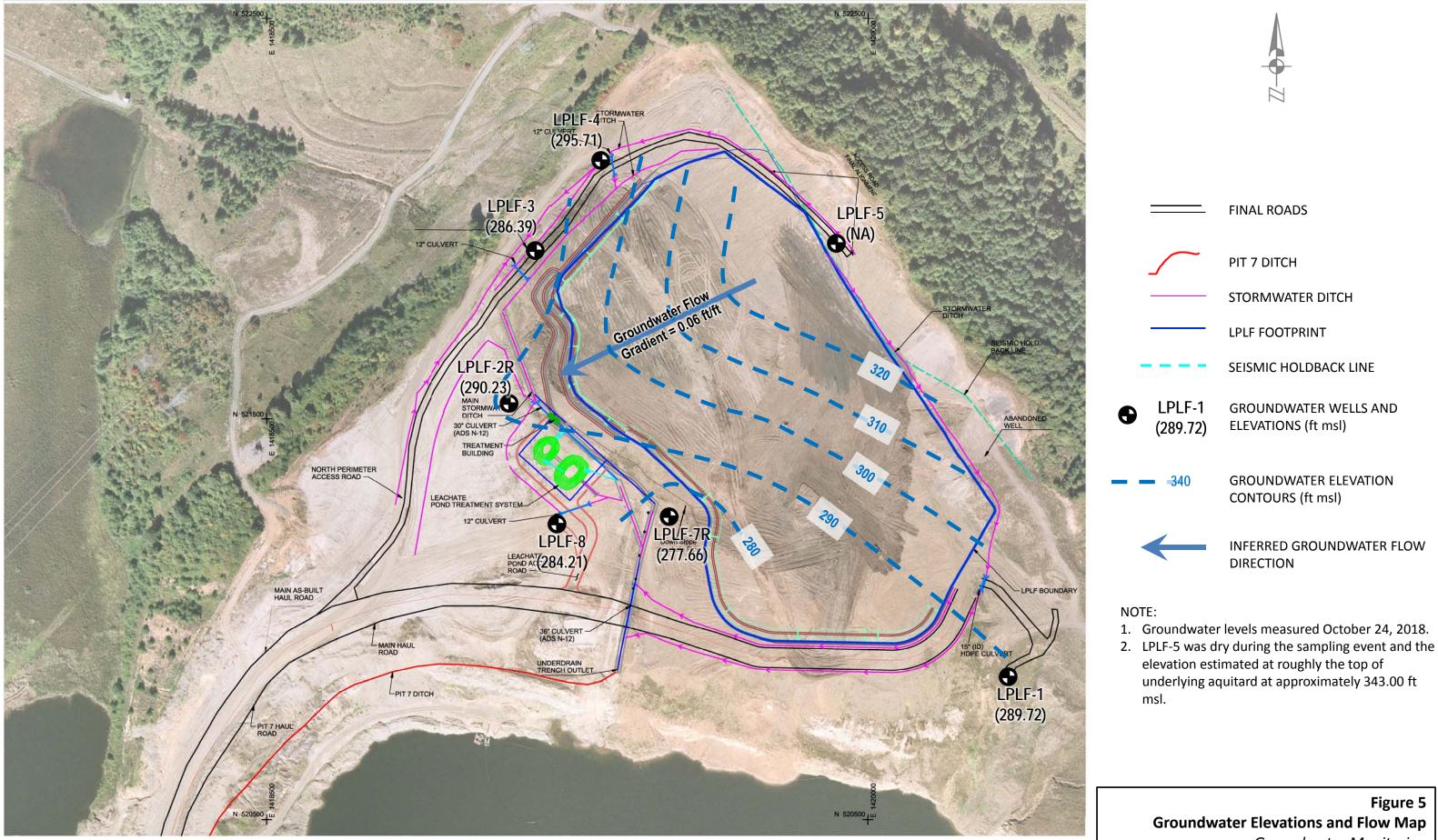




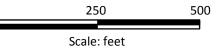
# ch2m:



## 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 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 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 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumpin	Q							
		$\overline{}$							
			$\rightarrow$						
		P							
					$\overline{)}$				
						$\overline{\}$			
							$\overline{\ }$		
							``		
Stabilization 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 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: 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 Criteria <sup>3</sup>	•		± 0.1 units	± 3%	± 0.3 mg/L		± 10 mV	± 10% <sup>4</sup>	
12.49	meters in consistent 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) 11			1	(7,53)
		1821		Fiel	d Parameter	S			
Time <sup>1</sup>	DTW <sup>2</sup>	Purge Vol. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumpir	ng							
-									
			$\overline{\}$						
				$\overline{}$					
				<b>6</b>		$\rightarrow$			
Stabilization									
Criteria <sup>3</sup>	=	-	± 0.1 units s for Low-Flow meth	± 3%	± 0.3 mg/L	-	± 10 mV 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 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 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. (ml)	pН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumpir		22.24						
	$\overline{}$								
							2		
				$\searrow$					
					<u></u>				
							$\overline{}$		
Stabilization 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 <sup>3</sup> Stabilization achi	meters in consistent eved after 3 succes	3-5 minute intervals sive readings for Low	s for Low-Flow meth w-Flow method; mir	nod 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 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 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 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 eved after 3 success						ceed 0.33 ft for Lov 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 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 d Road 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 47000 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 Sampled	Time Sampled	Lab ID	istno <b>2</b> to .	- <u>-</u>	oride	oride						Due Date:
1				ON	-	-		Hđ	ilu2 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	×	× ×	×	×	××				
						+							
						+							
						$\vdash$							
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. (ml)	pН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 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 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 ssive readings for Lo <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: Lity, State ZIP:	TransAlta											Bill	to:	2.1.4	1. 115	Bill	Schee	r						
Address: 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. Please call for
ample Custody Seals		Yes	No N/A		CATELO (TR	ers																		availability
Sample Identifica	ition	Matrix	Date Sampled	Time 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 tal			g, Al, As, B, Ba n Al As B Ba																		Ad			ethods Available Request
otal Ag, Al, As, B, Ba, Be, Ca, Cd, Co, C 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 Cooler Temp	Corrected. Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor		hermon 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. 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 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 58.08	
Pump Settin	-									
				Fiel	d Parameter	s				
Time <sup>1</sup>	DTW <sup>2</sup>	Purge Vol. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 ., and turbidity or D		v-Flow method		
<sup>4</sup> For turbidity read 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 11:40 (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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumpi	ng							
		1							
Stabilization 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 sive readings for Lo <sup>5</sup> Low-flow target p	w-Flow method; mi	nimum parameter :	subset: pH, sp. cond		ceed 0.33 ft for Lov 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	- Arrival	Time to Well:	10/24/18 11:40	
	od: 🗆 Bla	dder 🗆	Peristaltic	Grab	□ Other:		- 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. (ml)	pН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.	
	Begin Pumpi	ing								
									*	
•										
Stabilization Criteria <sup>3</sup>	•		± 0.1 units	± 3%	± 0.3 mg/L		± 10 mV	± 10% <sup>4</sup>		
<sup>1</sup> Collect field parar <sup>3</sup> Stabilization achie	neters in consistent wed after 3 success	3-5 minute intervals	for Low-Flow methors with the second se	nod nimum parameter :	<sup>2</sup> DTW: Total draws 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 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> Date: <u>ノのク24/18</u> Arrival Time to Well: <u>ノノ・4つ</u> Initial DTW (ft btc): <u>(フ.41)</u>				
Field Team:		Bill Scheer					_	Date:	10/24/18	
Weather/Tem	1p: 50	KAN	ARM	-			- Arrival	Time to Well:	11:40	
Purge Metho	d: 🗌 Blac	lder 🗆	Peristaltic	🗆 Grab	□ Other: _		- Initial D1	W (ft btc):	(7.41)	
Pump Setting	<b>F</b>								- <u>_</u>	
				- Fie	ld Parameter	s				
Time <sup>1</sup>	DTW <sup>2</sup>	Purge Vol. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.	
	Begin Pumpi	ng								
		0	.,							
Stabilization Criteria <sup>3</sup>	•		± 0.1 units	± 3%	± 0.3 mg/L		± 10 mV	± 10% <sup>4</sup>	•	
<sup>1</sup> Collect field parame <sup>3</sup> Stabilization achieve	ed after 3 success	ive readings for Lov	v-Flow method; min	nimum parameter :		own should not ex , and turbidity or D	ceed 0.33 ft for Low D	-Flow method		
<sup>4</sup> For turbidity reading Sample ID:		<sup>5</sup> Low-flow target p					c	ample Time:		
		(boron, calcium,						ample rime.		
	Appendix IV	(total metals, R 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 10-24-13 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
1	Begin Pump			(	(				
Stabilization Criteria <sup>3</sup>		•	± 0.1 units	± 3%	± 0.3 mg/L		± 10 mV	± 10% <sup>4</sup>	
		nt 3-5 minute interval ssive readings for Lo			<sup>2</sup> DTW: Total drawo 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 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 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 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 Sample ID:	102418			.5 L/min (0.03 - 0.13 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 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 ved after 3 successi	ve readings for Low	-Flow method; min	imum parameter su	<sup>2</sup> DTW: Total drawd ibset: pH, sp. cond.	own should not exc and turbidity or DC	eed 0.33 ft for Low )	Flow method		
<sup>4</sup> For turbidity readin 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 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 	2 Rich	11 alisAlta Certuralia Mining 013 Rig Hanaford Boad	ralla IV	5 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: 	l sche	bill scheer@transalta.com	nsalta.c	E	#od		
Project Name: LPLF CCR				家、翻送言		COMPACT 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 Sampled	Time Sampled	l of Contain	: unibsЯ \ 0	240 C / TD2	Т рН \ А( тругорания Тругорания Тругорания		\$0\$ / ¥	- sløteM \ D( sløteM \ A(	ZZ muibeA (						Due Date:
			'ON			_										<b>Comments</b>
۵ ۵	01/07/2019	14:15	m		×			X	хх							Boron and Calcium needed
010719-CCR-LPLF7R GW 01	01/07/2019	14:55				×										Chloride
									-	$\neg$						
									_				_	_	_	
		-			$\neg$											
							+						_			
			 			<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> 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 Criteria <sup>3</sup>	- meters in consistent	-	± 0.1 units	± 3%	± 0.3 mg/L.	- 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. (ml)	рН	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (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 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

RIGHT SOLUTIONS | RIGHT PARTNER



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 Sampled	Time 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											······
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[otal	A	g, Al, As, B, Ba 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> 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 356	N 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> 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 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:

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	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- data/water-sciences-home-page/laboratory-certification-branch/non-field-lab- certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaborator 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 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 MCL	Modified Maximum Contaminant Level is the highest permissible concentration of a substance 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 6010C 9056A SM 2540 C SM 4500-H+ B Sample Name:	053018-CCR-LPLF2R	<b>Extracted/Digested By</b> JHINSON	Analyzed By EMCALLISTER JCHAN SSPAIN ACHEATLEY Date Collected: 05/30/18
Lab Code:	K1805095-002		<b>Date Received:</b> 05/31/18
Sample Matrix: Analysis Method	Ground Water	Extracted/Digested By	Analyzed By
6010C 9056A SM 2540 C SM 4500-H+ B		JHINSON	EMCALLISTER JCHAN SSPAIN ACHEATLEY
Sample Name:	053018-CCR-LPLF5		<b>Date Collected:</b> 05/30/18
Lab Code: Sample Matrix:	K1805095-003 Ground Water		<b>Date Received:</b> 05/31/18
Analysis Method		Extracted/Digested By	Analyzed By
6010C		JHINSON	EMCALLISTER
9056A SM 2540 C			JCHAN 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> 9056A SM 2540 C SM 4500-H+ B		Extracted/Digested By	<b>Analyzed By</b> JCHAN SSPAIN ACHEATLEY
Sample Name: Lab Code: Sample Matrix:	053018-CCR-LPLF8 K1805095-005 Ground Water		Pate Collected: 05/30/18 Date Received: 05/31/18
<b>Analysis Method</b> 6010C 9056A SM 2540 C SM 4500-H+ B		<b>Extracted/Digested By</b> JHINSON	<b>Analyzed By</b> EMCALLISTER JCHAN SSPAIN 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

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## Metals

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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	Date Received: 05/31/18 13:30
Sample Name: Lab Code:	053018-CCR-LPLF1 K1805095-001	Basis: NA

Analyte Name	Analysis 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: Lab Code:	053018-CCR-LPLF2R K1805095-002	Basis: NA

Analyte Name	Analysis 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: Lab Code:	053018-CCR-LPLF5 K1805095-003	Basis: NA

Analyte Name	Analysis 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: Lab Code:	053018-CCR-LPLF7R K1805095-004	Basis: NA

Analyte Name	Analysis 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: Lab Code:	053018-CCR-LPLF8 K1805095-005	Basis: NA

Analyte Name	Analysis 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: Lab Code:	FD 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**

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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: Lab Code:	053018-CCR-LPLF1 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: Lab Code:	053018-CCR-LPLF1 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: Lab Code:	053018-CCR-LPLF2R 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: Lab Code:	053018-CCR-LPLF2R 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: Lab Code:	053018-CCR-LPLF5 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: Lab Code:	053018-CCR-LPLF5 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: Lab Code:	053018-CCR-LPLF7R 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: Lab Code:	053018-CCR-LPLF7R 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: Lab Code:	053018-CCR-LPLF8 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: Lab Code:	053018-CCR-LPLF8 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: Lab Code:	FD 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: Lab Code:	FD 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: Lab Code:	Method Blank KQ1807298-02	Basis: NA

**Total Metals** 

Analyte Name	Analysis 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: Lab Code:	Method Blank 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: Lab Code:	Method Blank 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: Lab Code:	Method Blank 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: Project: Sample Matrix:	Transalta Cer LPLF CCR Ground Wate		g, LLC			Dat Dat	vice Reque e Collected e Received e Analyzed	l: 05/ : 05/	805095 /30/18 /31/18 /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> 5-002MS		Duplicate M 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 Sample K1805095- 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: Project Sample Matrix:	Transalta Centralia Mining, LPLF CCR Ground Water	LLC			Service Request: Date Collected: 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 Sample K1805095-				
Analyte Name	Analysis Method	MRL	Sample Result	002DUP 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 L	1999	y cjesky	RE	QUE	STE	D AN	ALY	SIS	승규는				· · · · · · · · ·	TAT
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Sampler's Name:	Bill Schee	er		_															Next Day ***					
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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 Sampled	Time 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 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 X	ق 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
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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
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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. mp Blank Factor	Thermometer ID	Cooler/COC	NA	Tracking Numb		AFiled
	MA -12.1	352			• <del>_****_****</del> *** <u>***</u> ** <u>***</u> ** <u>***</u> ** <u>**</u> **		
			 	·			
4. Packing material: Inserts Bay			Wet Ice D	ry Ice Sleeves		. Gon	 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. N.	$\sim$	N
	able, tissue sample	-		e fable below. 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 Bottle Type	Out of Head- Temp space Bro	oke pH R	Volum eagent adde		Initials	Time

Sample ID	Bottle Type	Temp	space	Broke	pm	rteagent	audeo	Number	Initials	lime
			1							,
		1	1							
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			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- data/water-sciences-home-page/laboratory-certification-branch/non-field-lab- certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaborator 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 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 MCL	Modified Maximum Contaminant Level is the highest permissible concentration of a substance 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 6010C SM 2540 C		Extracted/Digested By JHINSON	<b>Analyzed By</b> AMCKORNEY JMADISON
Sample Name: Lab Code: Sample Matrix:	080918-CCR-LPLF8 K1807488-002 Water		<b>te Collected:</b> 08/9/18 <b>ite Received:</b> 08/9/18
<b>Analysis Method</b> 9056A		Extracted/Digested By	<b>Analyzed By</b> MRODRIGUEZ

Printed 8/24/2018 5:02:47 PM



# Sample Results

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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

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: Lab Code:	080918-CCR-LPLF2R K1807488-001	Basis:	NA

**Total Metals** 

Analyte Name	Analysis 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: Lab Code:	080918-CCR-LPLF2R 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: Lab Code:	080918-CCR-LPLF8 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

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: K18	807488
Project:	LPLF CCR	Date Collected: NA	
Sample Matrix:	Water	Date Received: NA	
Sample Name: Lab Code:	Method Blank KQ1810901-04	Basis: NA	

Analyte Name	Analysis 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: Lab Code:	Method Blank 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: Lab Code:	Method Blank 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: Lab Code:	Method Blank 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

> 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 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

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#### 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								
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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											
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(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 Cooler Temp         Corrected. Cooler Temp         Raw Temp Blank         Corrected Temp Blank         Corr. Factor         Thermometer 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 Bottle Type	1	Head- space	Broke	рН	Reagent	Volume added	Reagent Lot 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 F	L Zece		L	3x vol	L	for LPL	F7	R
MUE	$2\Pi$		<u> </u>	Comp	nent	szys 1	MS/A	for LPL 15D on L	PLFZ	2R.
		<b>i</b>								<u></u>
SHORT HOL	D IIME	8 51								

7/25/16

Page\_\_\_\_of\_



## **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- data/water-sciences-home-page/laboratory-certification-branch/non-field-lab- certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaborator 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 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 MCL	Modified Maximum Contaminant Level is the highest permissible concentration of a substance 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> 6010C 9056A SM 2540 C SM 4500-H+ B		<b>Extracted/Digested By</b> JHINSON	<b>Analyzed By</b> EMCALLISTER MVALVERDE JMADISON DBRADBURY
Sample Name: Lab Code:	053018-CCR-LPLF2R K1810468-002		<b>Date Collected:</b> 10/24/18 <b>Date Received:</b> 10/25/18
Sample Matrix:	Ground Water		<b>Date Received.</b> 10/25/10
<b>Analysis Method</b> 6010C 9056A SM 2540 C SM 4500-H+ B		<b>Extracted/Digested By</b> JHINSON	<b>Analyzed By</b> EMCALLISTER MVALVERDE JMADISON DBRADBURY
Sample Name: Lab Code: Sample Matrix:	FD K1810468-003 Ground Water		<b>Date Collected:</b> 10/24/18 <b>Date Received:</b> 10/25/18
<b>Analysis Method</b> 6010C 9056A SM 2540 C SM 4500-H+ B		Extracted/Digested By JHINSON	<b>Analyzed By</b> EMCALLISTER MVALVERDE JMADISON DBRADBURY
Sample Name: Lab Code: Sample Matrix:	102418-CCR-LPLF7R K1810468-004 Ground Water		<b>Date Collected:</b> 10/24/18 <b>Date Received:</b> 10/25/18
<b>Analysis Method</b> 6010C		<b>Extracted/Digested By</b> JHINSON	<b>Analyzed By</b> 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> 9056A SM 2540 C SM 4500-H+ B		Extracted/Digested By	<b>Analyzed By</b> MVALVERDE JMADISON DBRADBURY
Sample Name: Lab Code: Sample Matrix:	053018-CCR-LPLF8 K1810468-005 Ground Water		te Collected: 10/24/18 nte Received: 10/25/18
<b>Analysis Method</b> 6010C 9056A SM 2540 C SM 4500-H+ B		<b>Extracted/Digested By</b> JHINSON	<b>Analyzed By</b> EMCALLISTER MVALVERDE JMADISON DBRADBURY



## Sample Results

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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

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: Lab Code:	102418-CCR-LPLF1 K1810468-001	Basis: NA

Analvte Name	Analysis 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: Lab Code:	053018-CCR-LPLF2R K1810468-002	Basis: NA

Analyte Name	Analysis 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: Lab Code:	FD K1810468-003	Basis: NA

Analyte Name	Analysis 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: Lab Code:	102418-CCR-LPLF7R K1810468-004	Basis: NA

Analyte Name	Analysis 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: Lab Code:	053018-CCR-LPLF8 K1810468-005	Basis: NA

Analyte Name	Analysis 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**

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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: Lab Code:	102418-CCR-LPLF1 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: Lab Code:	102418-CCR-LPLF1 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: Lab Code:	053018-CCR-LPLF2R 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: Lab Code:	053018-CCR-LPLF2R 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: Lab Code:	FD 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: Lab Code:	102418-CCR-LPLF7R 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: Lab Code:	102418-CCR-LPLF7R 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: Lab Code:	053018-CCR-LPLF8 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: Lab Code:	053018-CCR-LPLF8 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

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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: Lab Code:	Method Blank KQ1815562-02	Basis: NA

**Total Metals** 

Analyte Name	Analysis 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

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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: Lab Code:	Method Blank 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: Lab Code:	Method Blank 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: Lab Code:	Method Blank 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: Lab Code:	Method Blank 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: Lab Code:	Method Blank 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: Lab Code:	102418-C K1810468	CR-LPLF7F 3-004	8						J <b>nits:</b> mg/L Basis:NA	,	
					e <b>rix Spike</b> 468-004M		Duplicate K181046	<b>Matrix Sp</b> 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: Project	Transalta Centralia Mining, LPLF CCR	LLC			Service Reque 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 Sample K1810468- 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 Sample K1810468- 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: Project: Sample Matrix:	Transalta Centralia Mining, LLC LPLF CCR Ground Water		Service Requ Date Analyze Date Extract	ed: 10/31/1	
		Control Sample Summary Solids, Total Dissolved			
Analysis Method: Prep Method:	SM 2540 C None		Units: Basis: Analysis Lot:	mg/L NA 613152	
Sample Name Lab Control Sample	Lab Code K1810468-LCS2	Result 508	Spike Amount 523	<b>% Rec</b> 97	% Rec Limits 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

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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

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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						
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	, 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 Sampled	Time 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 Т	ق X	б Х	ð							Comments
010719-CCR-LPLF7R	GW	01/07/2019	14:55		1				<u> </u> ^		x		^	^									Boron and Calcium needed Chloride
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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 Cooler Temp         Corrected. Cooler Temp         Raw Temp Blank         Corrected 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 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 Bottle Type	Out of Temp	Head- space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time
	······					 				
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## Notes, Discrepancies, & Resolutions:

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## Page\_\_\_\_of\_\_\_\_

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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- data/water-sciences-home-page/laboratory-certification-branch/non-field-lab- certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaborator 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 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 MCL	Modified Maximum Contaminant Level is the highest permissible concentration of a substance 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 tr	Total Petroleum Hydrocarbons 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/

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> 6010C 9056A SM 2540 C		Extracted/Digested By JHINSON	<b>Analyzed By</b> AMCKORNEY MRODRIGUEZ JMADISON
Sample Name: Lab Code: Sample Matrix:	010719-CCR-LPLF7R K1900152-002 Ground Water		<b>Date Collected:</b> 01/7/19 <b>Date Received:</b> 01/7/19
<b>Analysis Method</b> 9056A		Extracted/Digested By	<b>Analyzed By</b> 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: Lab Code:	010719-CCR-LPLF2R K1900152-001	Basis: NA

**Total Metals** 

Analyte Name	Analysis 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: Lab Code:	010719-CCR-LPLF2R 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: Lab Code:	010719-CCR-LPLF2R 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: Lab Code:	010719-CCR-LPLF7R 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: Lab Code:	Method Blank KQ1900246-02	Basis: NA

**Total Metals** 

Analyte Name	Analysis 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 Method	MRL	Sample Result	KQ1900246-03 Result	Average	RPI	<b>`</b>	RPD Limit
Analyte Name 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: Lab Code:	Method Blank 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: Lab Code:	Method Blank 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 Sample K1900152- 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