F I N A L

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

Prepared for

TransAlta Centralia Mining LLC

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ch2m:SM

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This Report has been certified by a Professional Engineer and a Hydrogeologist licensed in the State of Washington and employed by CH2M HILL Engineers, Inc., a wholly owned subsidiary of Jacobs Engineering Group Inc. as of December 15, 2017.

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Acronyms and Abbreviations

°C	degrees Celsius
CCR	coal combustion residuals
CCR SAP	*Groundwater Monitoring Sampling and Analysis Plan for the Limited Purpose Landfill at the TransAlta Centralia Mine*
CFR	Code of Federal Regulations
DQR	Double Quantification Rule
EPA	U.S. Environmental Protection Agency
HNO_3	nitric acid
LPLF	Limited Purpose Landfill
mg/L	milligram per liter
SSI	statistically significant increase
SWFPR	sitewide false positive rate
TCM	TransAlta Centralia Mine
UPL	Upper Prediction Limit
WAC	Washington Administrative Code

SECTION 1

Introduction

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.

SECTION 2

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_3
Calcium	EPA 6010C	0.05	HNO_3
Chloride	EPA 9056A	2.5	Chill to 4°C
Fluoride	EPA 9056A	0.05	Chill to 4°C
pH	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.

SECTION 3

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:

$$v = \frac{K_a i}{n_e}$$ Equation from Fetter, 1994

where:

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 3.88×10^{-5} 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.

SECTION 4

Statistical Evaluation

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:

$$UPL = \overline{x} + Ks \quad (1)$$

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:

$$LPL, UPL = \overline{x} \pm Ks \quad (2)$$

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 reports and submitted these to Ecology in accordance with Chapter 173-350[5], 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.*

SECTION 6

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.

SECTION 7

References

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

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Tables

Table 1. Groundwater Monitoring Well Network

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

Well	Installation Date	Coordinates in NAD27[1]		Reference Point		Well Screen Elevation[2]		Sand Pack Elevation[2]		Well		
		Northing	Easting	Top of Casing Elevation[2]	Top of Ground Elevation[2]	Top	Bottom	Top	Bottom	Depth[3]	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

General Notes:

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

Column Header Footnotes:

[1]Washington State Plane Coordinates (NAD27).

[2]All elevations in feet above mean sea level (NGVD29)

[3]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

Well	Date Sampled	Reference Point Elevation (ft)	Depth to Water (ft btc)	Groundwater Elevation (ft)	Temp (°C)	pH	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Conductivity (uS/cm)	Turbidity (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 Levels Only													
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	-	-
pH	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

Well	Constituent	Units	Method	Trending Calculated UCL (if needed) = { Intercept + [Slope* Time(days)] + Residual } Trend Removal	Intercept	Slope	Residual	K-Value	Lower Prediction Levels (LPL)	Upper Prediction Levels (UPL)	Calculated Upper Prediction Limits (compliance values) 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	pH	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	pH	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	pH	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 start					
11/14/2016	325	471	562	633	709	784

TIME (days) is the period from Nov. 14, 2016 to time of compliance event.

*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

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

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

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

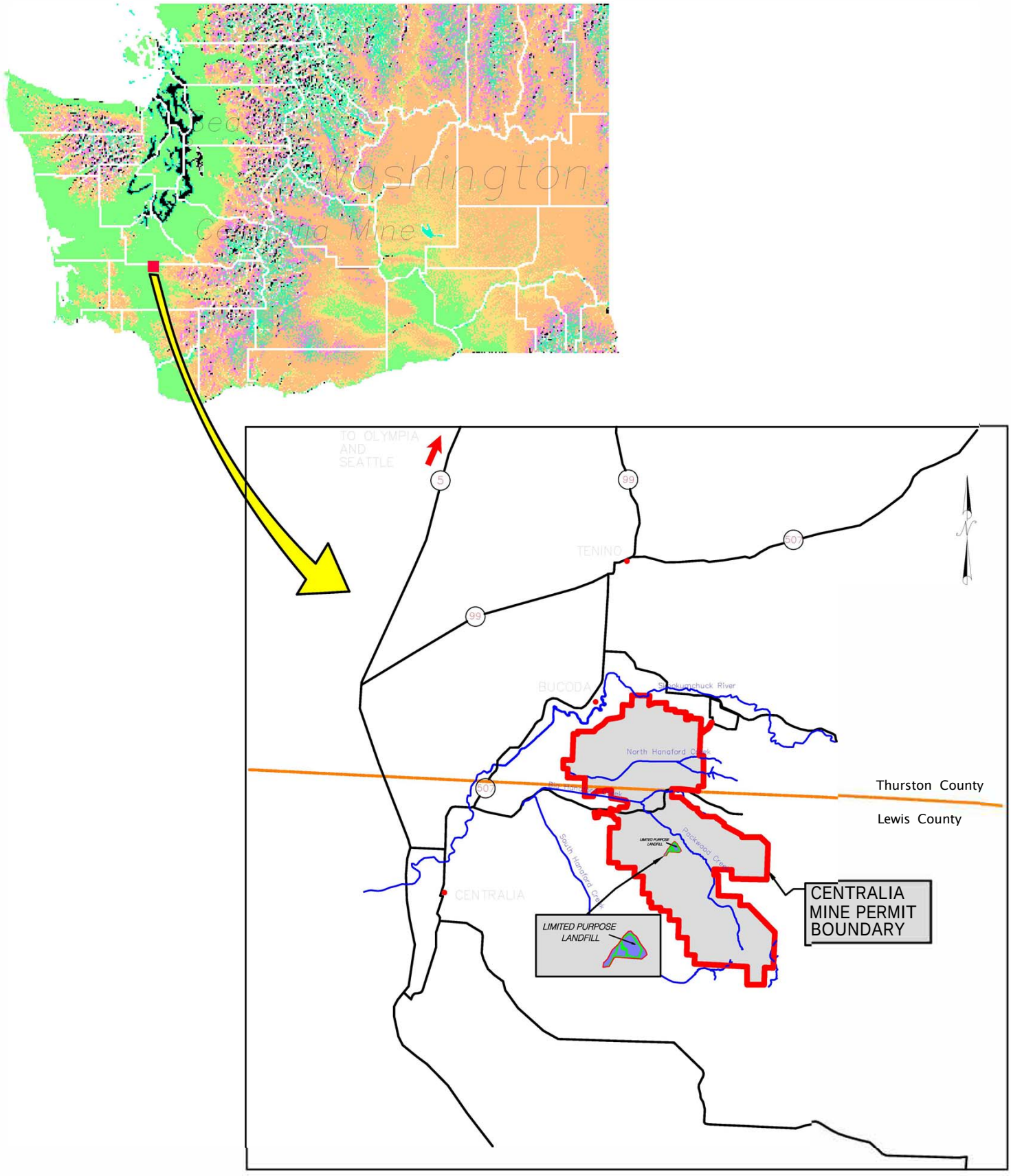


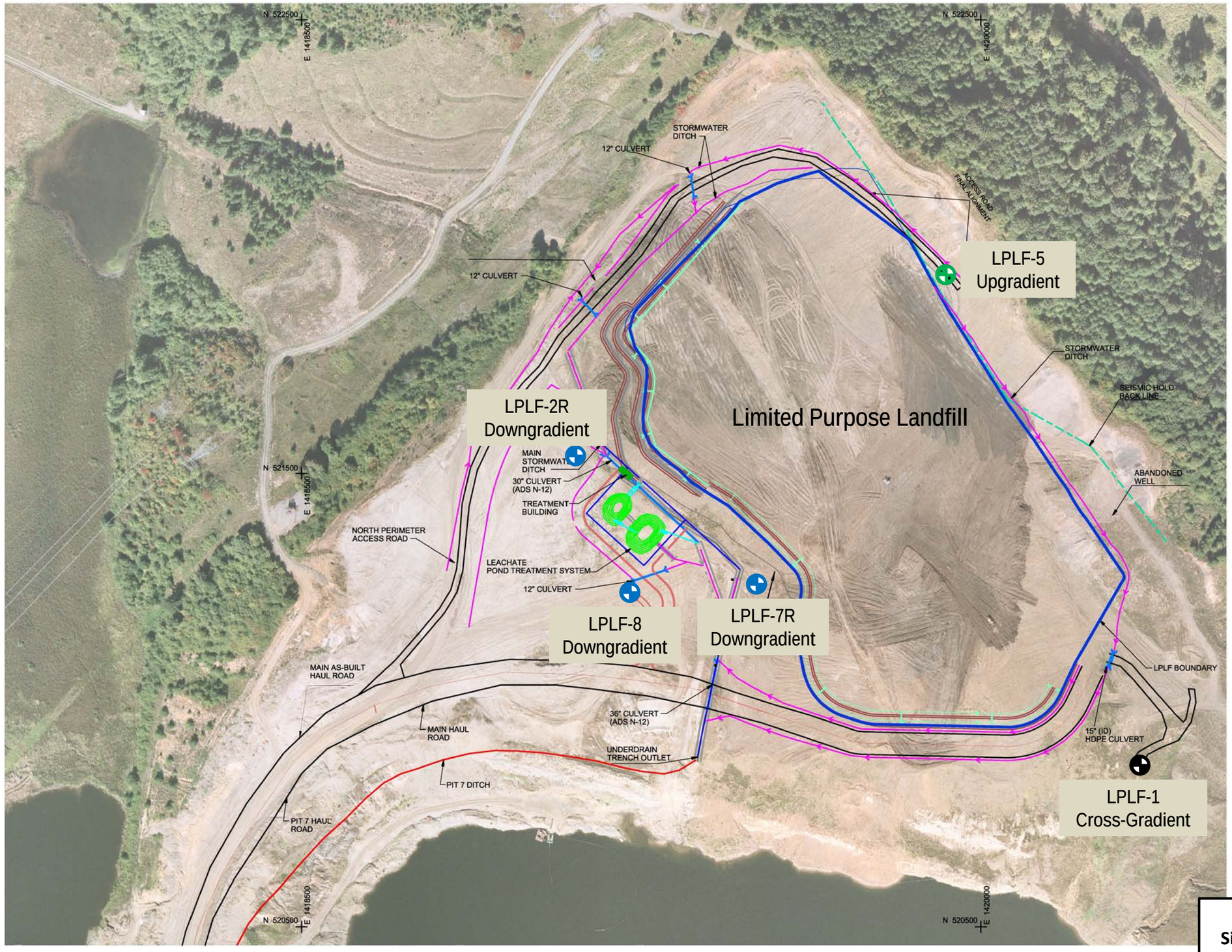
FIGURE 1

Vicinity Map

2018 Annual Groundwater Monitoring Report

Limited Purpose Landfill

January 2019



N

LEGEND

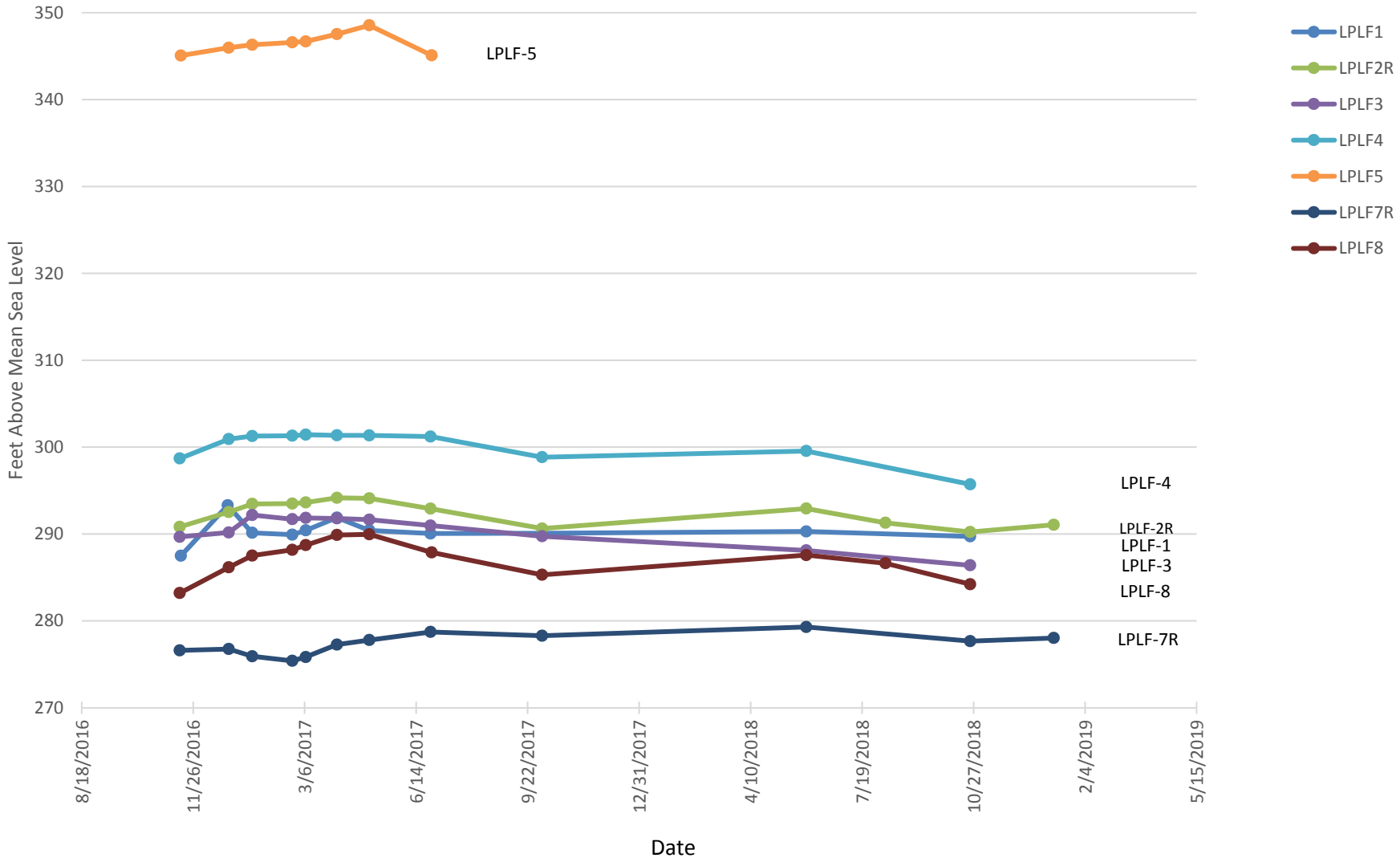
- FINAL ROADS
- PIT 7 DITCH
- STORMWATER DITCH
- LPLF FOOTPRINT
- SEISMIC HOLD BACK LINE
- UPGRADIENT MONITORING WELL
- CROSS-GRADIENT MONITORING WELL
- DOWNGRADIENT MONITORING WELL

0 250 500

Scale: feet

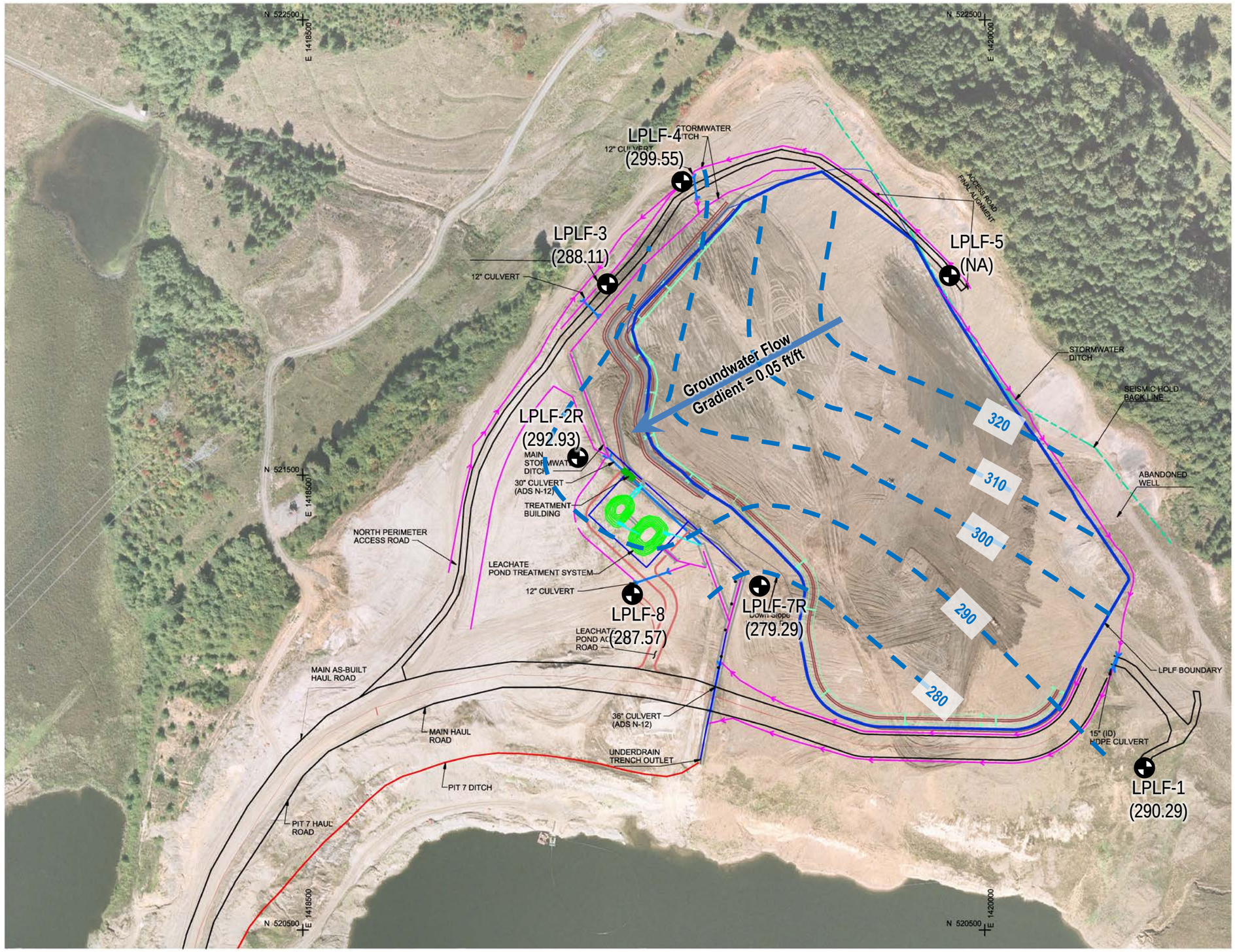
ch2m

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



Notes:
1. LPLF-5 dry 2018 sampling events.

Figure 3. Groundwater Elevation Hydrograph
2018 Annual Report for Limited Purpose Landfill
January 2019



FINAL ROADS

PIT 7 DITCH

STORMWATER DITCH

LPLF FOOTPRINT

SEISMIC HOLDBACK LINE

LPLF-1 (290.29) GROUNDWATER WELLS AND ELEVATIONS (ft msl)

340 GROUNDWATER ELEVATION CONTOURS (ft msl)

INFERRED GROUNDWATER FLOW DIRECTION

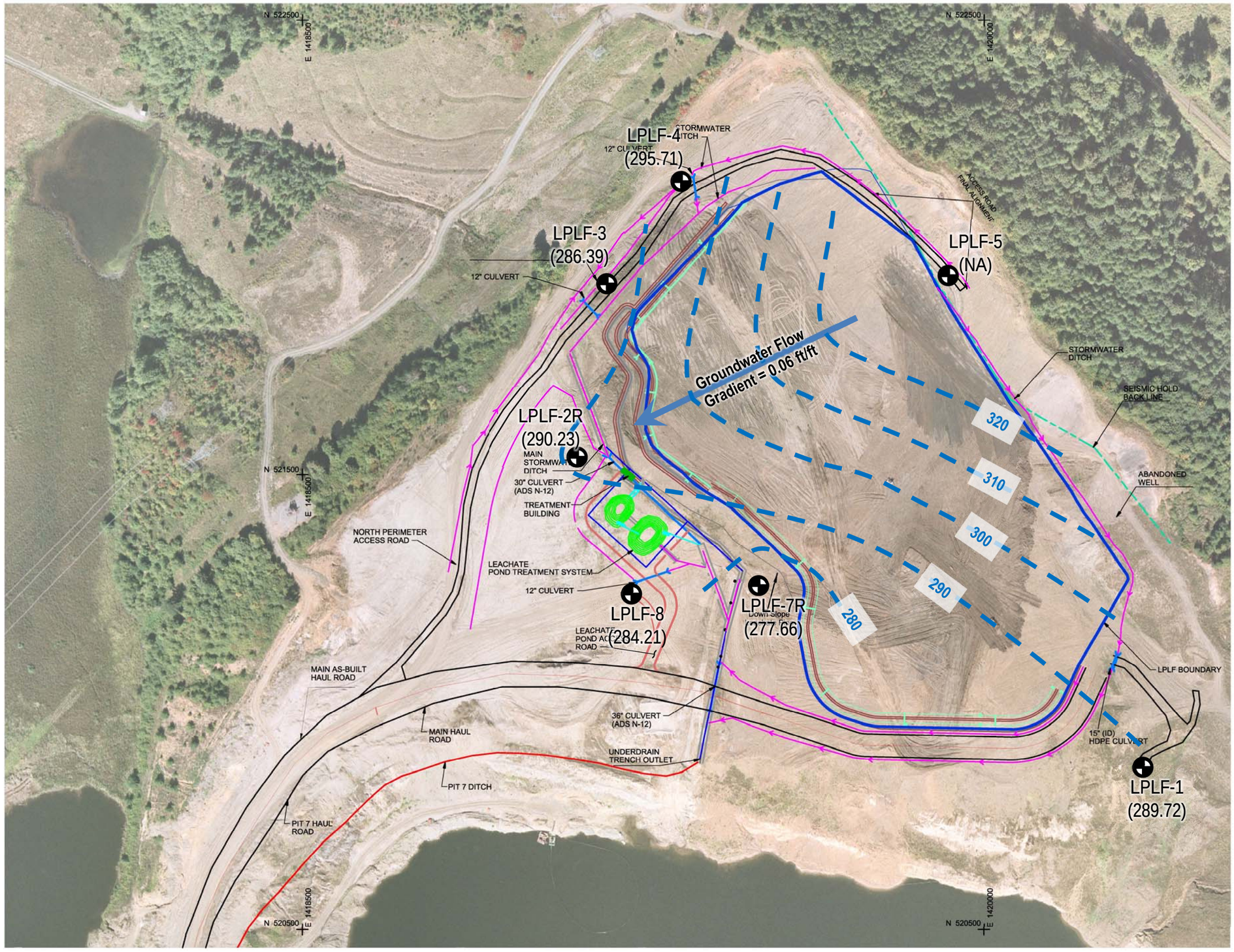
NOTE:

1. Groundwater levels measured May 30, 2018.
2. LPLF-5 was dry during the sampling event and the elevation estimated at roughly the top of underlying aquitard at approximately 343.00 ft msl.

0 250 500

Scale: feet

Figure 4
Groundwater Elevations and Flow Map
Groundwater Monitoring
Limited Purpose Landfill
May 30, 2018



FINAL ROADS

PIT 7 DITCH

STORMWATER DITCH

LPLF FOOTPRINT

SEISMIC HOLDBACK LINE

LPLF-1 (289.72) GROUNDWATER WELLS AND ELEVATIONS (ft msl)

340 GROUNDWATER ELEVATION CONTOURS (ft msl)

INFERRED GROUNDWATER FLOW DIRECTION

NOTE:

1. Groundwater levels measured October 24, 2018.
2. LPLF-5 was dry during the sampling event and the elevation estimated at roughly the top of underlying aquitard at approximately 343.00 ft msl.

0 250 500

Scale: feet

Figure 5
Groundwater Elevations and Flow Map
Groundwater Monitoring
Limited Purpose Landfill
October 24, 2018

Appendix A
Field Forms

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF 1

Field Team: Bill Scheer Date: 5/30/18

Weather/Temp: Sun & Breeze Arrival Time to Well: 12:15

Purge Method: ☐ Bladder ☐ Peristaltic ☐ Grab ☒ Other: Bailer **Initial DTW (ft btc):** 57.51

Pump Setting [5]: — Notes:

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumping								
			6.46	3171	1.65	12.6		110.5	
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: 053018-CCR-LPLF1 **Sample Time:** 12:20

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): —

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF2

Field Team: Bill Scheer Date: 5-30-18

Weather/Temp: Sunny/WARM Arrival Time to Well: 13:35

Purge Method: ☐ Bladder ☐ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** (11.9)

Pump Setting [5]: _____ Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumping								
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: _____ **Sample Time:** _____

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): _____

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

_____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF2R

Field Team: Bill Scheer Date: 5-30-18

Weather/Temp: SUN & WARM Arrival Time to Well: 13:20

Purge Method: ☐ Bladder ☒ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** (3.11)

Pump Setting [5]: 125 ml/min Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
5	*Begin Pumping*								
10	(3.19)	1250	6.14	3844	~~38~~71	14.9	24.2	6.1	
15	(3.23)	1875	6.13	3820	.54	15.1	24.4	5.9	
20	(3.29)	2500	6.13	3835	.48	15.1	24.4	6.3	
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: 053018-CCR-LPLF2R **Sample Time:** 13:40

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☒ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): 2500

QC Sample ID : 053018-CCR-LPLF2R QC Sample Time: SAME

Comments: _____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CER **Well ID:** LPLF 3

Field Team: Bill Scheer Date: 5-30-18

Weather/Temp: Sun & WARM Arrival Time to Well: 13:25

Purge Method: ☐ Bladder ☐ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** ~~11.9~~ 7.53

Pump Setting [5]: _____ Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumping								
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: _____ **Sample Time:** _____

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): _____

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF 4

Field Team: Bill Scheer Date: 5-30-18

Weather/Temp: Sun & WARM Arrival Time to Well: 13:30

Purge Method: ☐ Bladder ☐ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** (3.57)

Pump Setting [5]: _____ Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumping								
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: _____ **Sample Time:** _____

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): _____

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

_____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF5

Field Team: Bill Scheer Date: 5-30-18

Weather/Temp: Sunny WARM Arrival Time to Well: 14:00

Purge Method: ☐ Bladder ☒ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** _____

Pump Setting [5]: 100 ml/min Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
5	*Begin Pumping*								
9			6.63	2016	3.66	13.8		5.9	
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: 053018-CCR-LPLF5 **Sample Time:** 14:20

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): _____

QC Sample ID : _____ QC Sample Time: _____

Comments: Not _____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF 7R

Field Team: Bill Scheer Date: 5-30-18

Weather/Temp: Sun & Breezy Arrival Time to Well: 12:20

Purge Method: ☒ Bladder ☒ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** (19.71)

Pump Setting [5]: 150 ml/min Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
5	*Begin Pumping*								
10	(20.03)	1500	6.05	2873	.82	14.7	136.0	1.3	
15	(20.10)	2250	6.04	2881	.80	14.6	136.8	1.2	
20	(20.09	3000	6.04	2883	.81	14.6	136.7	1.2	
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: 053018-CCR-LPLF 7R **Sample Time:** 12:40

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☒ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): 3000

QC Sample ID : 053018-CCR-LPLF 7R FD QC Sample Time: 12:40

Comments: _____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF 8

Field Team: Bill Scheer Date: 5-30-18

Weather/Temp: CLOUDS & WARM Arrival Time to Well: 12:50

Purge Method: ☐ Bladder ☒ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** (11.18)

Pump Setting [5]: 100 ml/min Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
5	*Begin Pumping*								
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	3797	.95	15.1		1.5	
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: 053018-CCR-LPLF 8 **Sample Time:** 13:10

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): 2000

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

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

Part of the ALS Group A Campbell Brothers Limited Company

Work Order No.: 80819

Chain of Custody

Project Manager:	Bill Scheer		**Bill to:**	Bill Scheer	
Client Name:	TransAlta Centralia Mining Company		**Company:**	TransAlta Centralia Mining	
Address:	913 Big Hanaford Road		**Address:**	913 Big Hanaford Road	
City, State ZIP:	Centralia, WA 98531		**City, State ZIP:**	Centralia, WA 98531	
Email:	bill_scheer@transalta.com	**Phone:** 360-330-2332	**Email:**	bill_scheer@transalta.com	**po#**
Project Name:	LPLF CCR				
Project Number:					
P.O. Number:	4700075456 Line90				
Sampler's Name:	Bill Scheer				

SAMPLE RECEIPT

Temperature (°C):		Temp Blank Present		
Received Intact:	Yes	No	N/A	Wet Ice / Blue Ice
Cooler Custody Seals:	Yes	No	N/A	Total Containers:
Sample Custody Seals:	Yes	No	N/A	

REQUESTED ANALYSIS

TAT

- ☐ Routine 21day
- ☐ Same Day 100%
- ☐ Next Day ***
- ☐ 3 Day
- ☐ 5 Day 50%

Surcharges. Please call for availability

Due Date:

Sample Identification	Matrix	Date Sampled	Time Sampled	Lab ID	No. of Containers	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	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	X	X	X	X	X	X	X	MS/MSD
053018 - CCR - LPLF5	GW	05/30/2018	14:20		2	X	X	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	
FD	GW				3	X	X	X	X	X	X	X	

Dissolved	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr
Total	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr

Additional Methods Available Upon Request

RELINQUISHED BY			RECEIVED BY		
Print Name	Signature	Date/Time	Print Name	Signature	Date/Time
William Scheer		05/31/2018			

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF2R

Field Team: Bill Scheer Date: 8-9-18

Weather/Temp: SUNNY & WARM Arrival Time to Well: 8:25

Purge Method: ☐ Bladder ☒ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** (4.75)

Pump Setting [5]: 200 ml/min Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
5	*Begin Pumping*								
10	(4.81)	2000	5.83	3861	.95	15.5			
15	(4.93)	3000	5.81	3857	.90	15.3			
20	(4.95)	4000	5.81	3855	.87	15.1			
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: 080918-CCR-LPLF2R **Sample Time:** 8:45

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): 2000

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF8

Field Team: Bill Scheer Date: 8-9-18

Weather/Temp: Sun & Hot Arrival Time to Well: 9:00

Purge Method: ☐ Bladder ☒ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** (12.12)

Pump Setting [5]: 120 ml/min Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
15	*Begin Pumping*								
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	14.71			
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: 080918-CCR-LPLF8 **Sample Time:** 9:20

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): 2400

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

K1810468

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 Scheer		Bill to:	Bill Scheer	
Client Name:	TransAlta Centralia Mining Company		Company:	TransAlta Centralia Mining	
Address:	913 Big Hanaford Road		Address:	913 Big Hanaford Road	
City, State ZIP:	Centralia, WA 98531		City, State ZIP:	Centralia, WA 98531	
Email:	bill_scheer@transalta.com	Phone: 360-330-2332	Email:	bill_scheer@transalta.com	po#
Project Name:	LPLF CCR				
Project Number:					
P.O. Number:	4700075456 Line90				
Sampler's Name:	Bill Scheer				

SAMPLE RECEIPT

Temperature (°C):		Temp Blank Present				
Received Intact:	Yes	No	N/A	Wet Ice / Blue Ice		
Cooler Custody Seals:	Yes	No	N/A	Total Containers:		
Sample Custody Seals:	Yes	No	N/A			

REQUESTED ANALYSIS

TAT

- ☐ Routine 21day
- ☐ Same Day 100%
- ☐ Next Day ***
- ☐ 3 Day
- ☒ 5 Day 50%

Surcharges. Please call for availability

Due Date:

Sample Identification	Matrix	Date Sampled	Time Sampled	Lab ID	No. of Containers		Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Comments
102418 - CCR - LPLF1	GW	10/24/2018	9:25		3		X	X	X	X	X	X	X	
053018 - CCR - LPLF2R	GW	10/24/2018	11:55		3		X	X	X	X	X	X	X	MS/MSD
FD	GW				3		X	X	X	X	X	X	X	
102418 - CCR - LPLF7R	GW	10/24/2018	9:50		9		X	X	X	X	X	X	X	
053018 - CCR - LPLF8	GW	10/24/2018	10:30		3		X	X	X	X	X	X	X	

Dissolved	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr
Total	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr

Additional Methods Available Upon Request

RELINQUISHED BY			RECEIVED BY		
Print Name	Signature	Date/Time	Print Name	Signature	Date/Time
William Scheer		10/25/2018	Cody Graves		10/25/18 1410

PC KC

Cooler Receipt and Preservation Form

Client Transalta 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) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 1 Front
   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. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number (NA)	Filed
-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.)? NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA (Y) 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 (CG 10/25/18 Y) (N)
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y (N)
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:
10248CCR-LPLF2R	053018-CCR-LPLF2R	Elimination
10248-CCR-LPLF8	053018-CCR-LPLF8	Elimination

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time
10248-CCR-LPLF7R	1-250ml P				X	HNO_3	0.5ml	RE1-48-4	CG	1420

Notes, Discrepancies, & Resolutions: RUSH Received 3X volume for LPLF7R
COC comment says MS/MSD on LPLF2R.
SHORT HOLD TIME

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF1

Field Team: Bill Scheer Date: 10/24/18

Weather/Temp: Sun & Cool Arrival Time to Well: 9:15

Purge Method: ☐ Bladder ☐ Peristaltic ☐ Grab ☒ Other: Bailer **Initial DTW (ft btc):** 58.08

Pump Setting [5]: Notes:

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumping								
—	—	—	6.65	3300	1.51	13.0		128.9	
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: 102418-CCR-LPLF1 **Sample Time:** 9:25

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): _____

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF 2

Field Team: Bill Scheer Date: 10/24/18

Weather/Temp: Sun & Cool Arrival Time to Well: 11:40

Purge Method: ☐ Bladder ☐ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** (14.91)

Pump Setting [5]: WATER LEVEL ONLY Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumping								
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

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

[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO

[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: _____ **Sample Time:** _____

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)

☐ Appendix IV (total metals, Radium 226, and Radium 228).

☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): _____

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

_____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF2R

Field Team: Bill Scheer Date: 10-24-18

Weather/Temp: _____ Arrival Time to Well: 11:35

Purge Method: ☐ Bladder ☒ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** 5.88

Pump Setting [5]: 150 ml/min Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
5	*Begin Pumping*								
10	5.93	1500	6.14	3982		13.5		1.7	
15	5.97	~~2250~~	6.12	3986		13.5		1.4	
20	5.99	3000	6.11	3985		13.5		1.5	
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: 102418-CCR-LPLF2R **Sample Time:** 11:55

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): 3000

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF 3

Field Team: Bill Scheer Date: 10/24/18

Weather/Temp: Sun & Cool Arrival Time to Well: 11:40

Purge Method: ☐ Bladder ☐ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** (9.25)

Pump Setting [5]: _____ Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumping								
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

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

[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO

[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: _____ **Sample Time:** _____

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)

☐ Appendix IV (total metals, Radium 226, and Radium 228).

☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): _____

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

_____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: _____ **Well ID:** LPLF 4

Field Team: Bill Scheer Date: 10/24/18

Weather/Temp: Sun & Warm Arrival Time to Well: 11:40

Purge Method: ☐ Bladder ☐ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** (7.41)

Pump Setting [5]: _____ Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumping								
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

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

[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO

[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: _____ **Sample Time:** _____

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)

☐ Appendix IV (total metals, Radium 226, and Radium 228).

☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): _____

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

_____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF5

Field Team: Bill Scheer Date: 10-24-18

Weather/Temp: Cloudy & Cool Arrival Time to Well: 11:45

Purge Method: ☐ Bladder ☐ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** —

Pump Setting [5]: 1 Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
	Begin Pumping								
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

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

[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO

[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: _____ **Sample Time:** _____

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)

☐ Appendix IV (total metals, Radium 226, and Radium 228).

☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): _____

QC Sample ID : _____ QC Sample Time: _____

Comments: NO WATER IN WELL

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: _____ **Well ID:** LPLF 7R

Field Team: Bill Scheer Date: 10-24-18

Weather/Temp: Clouds & Cool Arrival Time to Well: 9:30

Purge Method: ☐ Bladder ☒ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** 21.34

Pump Setting [5]: 100 ml/min Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
5	*Begin Pumping*								
10		1000	6.21	2948	1.18	12.7		3.8	
15		1500	5.95	2938	.82	12.7		2.9	
20		2000	5.98	2933	.84	12.7		2.9	
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: 10241B-CCR-LPLF7R **Sample Time:** 9:50

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☐ Field Duplicate ☒ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): 2000

QC Sample ID : _____ QC Sample Time: _____

Comments: _____

Groundwater Purging and Sampling Form

SITE: TCM LPLF Project Number: CCR **Well ID:** LPLF 8

Field Team: Bill Scheer Date: 10-24-18

Weather/Temp: Clouds & Cool Arrival Time to Well: 10:10

Purge Method: ☐ Bladder ☒ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft btc):** 14.54

Pump Setting [5]: 100 ML/MIN Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
5	*Begin Pumping*								
10	14.65	1000	6.27	3801	.99	13.7		3.4	
15	14.71	1500	6.15	3806	.91	13.6		3.4	
20	14.78	2000	6.13	3805	.93	13.6		3.4	
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

[1] Collect field parameters in consistent 3-5 minute intervals for Low-Flow method [2] DTW: Total drawdown should not exceed 0.33 ft for Low-Flow method
[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO
[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Sample ID: 102418-CCR-LPLF 8 **Sample Time:** 10:30

Analysis: ☐ Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS)
☐ Appendix IV (total metals, Radium 226, and Radium 228).
☐ Other, specify _____

QC SAMPLE : ☒ Field Duplicate ☐ MS/MSD ☐ EQ Rinsate Blank TOTAL PURGED (ml): 2000

QC Sample ID : FD QC Sample Time: _____

Comments: _____

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

Part of the ALS Group A Campbell Brothers Limited Company

Work Order No.: 80819

Chain of Custody

Project Manager:	Bill Scheer		Bill to:	Bill Scheer	
Client Name:	TransAlta Centralia Mining Company		Company:	TransAlta Centralia Mining	
Address:	913 Big Hanaford Road		Address:	913 Big Hanaford Road	
City, State ZIP:	Centralia, WA 98531		City, State ZIP:	Centralia, WA 98531	
Email:	bill_scheer@transalta.com	Phone: 360-330-2332	Email:	bill_scheer@transalta.com	po#
Project Name:	LPLF CCR				
Project Number:					
P.O. Number:	4700075456 Line90				
Sampler's Name:	Bill Scheer				

SAMPLE RECEIPT

Temperature (°C):		Temp Blank Present			
Received Intact:	Yes	No	N/A	Wet Ice / Blue Ice	
Cooler Custody Seals:	Yes	No	N/A	Total Containers:	
Sample Custody Seals:	Yes	No	N/A		

REQUESTED ANALYSIS

Sample Identification	Matrix	Date Sampled	Time Sampled	Lab ID	No. of Containers		SM 4500-H + B / pH	904.0 / Radium 228	SM 2540 C / TDS	7470A / Hg T	9056A / Chloride	9056A / F	9056A / SO4	6010C / Metals T	6020A / Metals T	903.0 Radium 226
010719-CCR-LPLF2R	GW	01/07/2019	14:15		3				X				X	X	X	
010719-CCR-LPLF7R	GW	01/07/2019	14:55		1						X					

TAT

- [ ] Routine 21day
- [ ] Same Day 100%
- [ ] Next Day ***
- [ ] 3 Day
- [x] 5 Day 50%

Surcharges. Please call for availability

Due Date:

Comments

Boron and Calcium needed

Chloride

Dissolved	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr
Total	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr

Additional Methods Available Upon Request

RELINQUISHED BY			RECEIVED BY		
Print Name	Signature	Date/Time	Print Name	Signature	Date/Time
William Scheer		01/07/2019			1/7/19 1605

TransAlta Centralia Mining LLC
Groundwater Purging and Sampling Form

SITE: TransAlta Centralia Mine Project: LPLF GW CCR **Well ID:** LPLF7R

Field Team: Bill Scheer Date: 1/7/19

Weather/Temp: Clouds & Cool Arrival Time to Well: 14:35

Purge Method: ☐ Bladder ☒ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft BTOC):** (20.98)

Pump Setting [5]: 150 ml/min Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
5	*Begin Pumping*								
10	(20.25)	1000	6.11	2863	.91	12.8		1.8	
15	(21.30)	1500	6.05	2861	.90	12.9		1.5	
20	(21.32)	3000	6.04	2865	.90	12.9		1.4	
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

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

[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO

[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Type	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	Good
Sample Treatment	N/A
Field Instrument	3000 ↓ ↑ YSI PRO
Total Purged (ml)	

Comments: _____

TransAlta Centralia Mining LLC
Groundwater Purging and Sampling Form

SITE: TransAlta Centralia Mine Project: LPLF GW CCR **Well ID:** LPLF 2R

Field Team: Bill Scheer Date: 1/7/19

Weather/Temp: Clouds & Cool Arrival Time to Well: 13:55

Purge Method: ☐ Bladder ☒ Peristaltic ☐ Grab ☐ Other: _____ **Initial DTW (ft bgl):** (4.98)

Pump Setting [5]: 200 ml/min Notes: _____

Field Parameters									
Time [1]	DTW [2]	Purge Vol. (ml)	pH	Sp. Cond. (uS/cm)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (NTU)	Note color, odor, etc.
5	*Begin Pumping*								
10	(5.07)	2000	6.19	3915	.93	13.3		2.1	
15	(5.09)	3000	6.17	3918	.85	13.3		1.4	
20	(5.11)	4000	6.17	3921	.81	13.4		1.3	
Stabilization Criteria [3]	-	-	± 0.1 units	± 3%	± 0.3 mg/L	-	± 10 mV	± 10% [4]	-

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

[3] Stabilization achieved after 3 successive readings for Low-Flow method; minimum parameter subset: pH, sp. cond., and turbidity or DO

[4] For turbidity readings > 10 NTUs [5] Low-flow target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Type	Treatment	Quantity	Container Type
2	None	250	Plastic
1	Unfiltered, HNO3	125ml	Plastic
~~1~~	Filter, HNO3	~~125ml~~	Plastic
	Unfiltered, H2SO4		Plastic
	Filter, HCL		Glass
	H2SO4		Glass

Sample Time	14:15
Confidence	Good
Sample Treatment	N/A
Field Instrument	4000
Total Purged (ml)	451 P120

Comments: _____

Appendix B
Laboratory Report

June 15, 2018 Service Request No:K1805095

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

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

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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/DLCS).

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 4ºC upon receipt at the laboratory.

Metals:

No significant anomalies were noted with this analysis.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by Noe D. Dan Date 06/15/2018

SAMPLE DETECTION SUMMARY

CLIENT ID: 053018-CCR-LPLF1			Lab ID: K1805095-001			
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
pH	6.88				pH Units	SM 4500-H+ B
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 ID: K1805095-002			
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
pH	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 ID: K1805095-003			
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
pH	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 ID: K1805095-004			
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
pH	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			Lab ID: K1805095-005			
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
pH	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	Lab ID: K1805095-006					
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
pH	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

Client: Transalta Centralia Mining, LLC **Service Request:**K1805095
Project: LPLF CCR

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
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 Scheer		**Bill to:**	Bill Scheer	
Client Name:	TransAlta Centralia Mining Company		**Company:**	TransAlta Centralia Mining	
Address:	913 Big Hanaford Road		**Address:**	913 Big Hanaford Road	
City, State ZIP:	Centralia, WA 98531		**City, State ZIP:**	Centralia, WA 98531	
Email:	bill_scheer@transalta.com	**Phone:** 360-330-2332	**Email:**	bill_scheer@transalta.com	**po#**
Project Name:	LPLF CCR				
Project Number:					
P.O. Number:	4700075456 Line90				
Sampler's Name:	Bill Scheer				

SAMPLE RECEIPT

Temperature (°C):		Temp Blank Present			
Received Intact:	Yes	No	N/A	Wet Ice / Blue Ice	
Cooler Custody Seals:	Yes	No	N/A	Total Containers:	
Sample Custody Seals:	Yes	No	N/A		

REQUESTED ANALYSIS

TAT

- ☐ Routine 21day
- ☐ Same Day 100%
- ☐ Next Day ***
- ☐ 3 Day
- ☒ 5 Day 50%

Surcharges. Please call for availability

Due Date:

Sample Identification	Matrix	Date Sampled	Time Sampled	Lab ID	No. of Containers		Boron	Calcium	Chloride	Fluoride	pH	Sulfate	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		X	X	X	X	X	X	X	MS/MSD
053018 - CCR - LPLF5	GW	05/30/2018	14:20		2		X	X	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	
FD	GW				3		X	X	X	X	X	X	X	

Dissolved	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr
Total	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr

Additional Methods Available Upon Request

RELINQUISHED BY			RECEIVED BY		
Print Name	Signature	Date/Time	Print Name	Signature	Date/Time
William Scheer		05/31/2018			5-31-18 1330

PC KC

Cooler Receipt and Preservation Form

Client TRANSALTA Service Request K18 05095

Received: 5-31-18 Opened: 5-31-18 By: DSP Unloaded: 5-31-18 By: DSP

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 (Y) N If yes, how many and where? 1 TOP FRNT
   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. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
1.8	2.0	1.0	1.2	+0.2	356	80819		

4. Packing material: *Inserts* *Baggies* (*Bubble Wrap*) (*Gel Packs*) *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA (Y) 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 (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

SHORT HOLD TIME RUSH

Miscellaneous Forms

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

Inorganic Data Qualifiers

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

Metals Data Qualifiers

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

Organic Data Qualifiers

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

Additional Petroleum Hydrocarbon Specific Qualifiers

F	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/EnvironmentalLaboratoryAccreditation/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	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	Modified
MCL	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.

Client: Transalta Centralia Mining, LLC **Service Request:** K1805095
Project: LPLF CCR

Sample Name: 053018-CCR-LPLF1 **Date Collected:** 05/30/18
Lab Code: K1805095-001 **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 Name: 053018-CCR-LPLF2R **Date Collected:** 05/30/18
Lab Code: K1805095-002 **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 Name: 053018-CCR-LPLF5 **Date Collected:** 05/30/18
Lab Code: K1805095-003 **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 Name: 053018-CCR-LPLF7R **Date Collected:** 05/30/18
Lab Code: K1805095-004 **Date Received:** 05/31/18
Sample Matrix: Ground Water

Analysis Method	Extracted/Digested By	Analyzed By
6010C	JHINSON	EMCALLISTER

Client: Transalta Centralia Mining, LLC **Service Request:** K1805095
Project: LPLF CCR

Sample Name: 053018-CCR-LPLF7R **Date Collected:** 05/30/18
Lab Code: K1805095-004 **Date Received:** 05/31/18
Sample Matrix: Ground Water

Analysis Method	Extracted/Digested By	Analyzed By
9056A		JCHAN
SM 2540 C		SSPAIN
SM 4500-H+ B		ACHEATLEY

Sample Name: 053018-CCR-LPLF8 **Date Collected:** 05/30/18
Lab Code: K1805095-005 **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 Name: FD **Date Collected:** 05/30/18
Lab Code: K1805095-006 **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	**Date Collected:**	05/30/18 12:15
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF1	**Basis:**	NA
Lab Code:	K1805095-001		

Total Metals

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	**Date Collected:**	05/30/18 13:40
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF2R	**Basis:**	NA
Lab Code:	K1805095-002		

Total Metals

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	**Date Collected:**	05/30/18 14:20
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF5	**Basis:**	NA
Lab Code:	K1805095-003		

Total Metals

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	**Date Collected:**	05/30/18 12:40
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF7R	**Basis:**	NA
Lab Code:	K1805095-004		

Total Metals

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	**Date Collected:**	05/30/18 13:10
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF8	**Basis:**	NA
Lab Code:	K1805095-005		

Total Metals

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:**	K1805095
Project:	LPLF CCR	**Date Collected:**	05/30/18
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	FD	**Basis:**	NA
Lab Code:	K1805095-006		

Total Metals

Analyte Name	Analysis 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	**Date Collected:**	05/30/18 12:15
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF1	**Basis:**	NA
Lab Code:	K1805095-001		

General Chemistry Parameters

Analyte Name	Analysis Method	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	
pH	SM 4500-H+ B	**6.88**	pH Units	-	1	05/31/18 17:03	H
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	**Date Collected:**	05/30/18 12:15
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF1	**Basis:**	NA
Lab Code:	K1805095-001		

General Chemistry Parameters

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	**Date Collected:**	05/30/18 13:40
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF2R	**Basis:**	NA
Lab Code:	K1805095-002		

General Chemistry Parameters

Analyte Name	Analysis Method	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	
pH	SM 4500-H+ B	**6.60**	pH Units	-	1	05/31/18 17:04	H
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	**Date Collected:**	05/30/18 13:40
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF2R	**Basis:**	NA
Lab Code:	K1805095-002		

General Chemistry Parameters

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	**Date Collected:**	05/30/18 14:20
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF5	**Basis:**	NA
Lab Code:	K1805095-003		

General Chemistry Parameters

Analyte Name	Analysis Method	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	
pH	SM 4500-H+ B	**7.36**	pH Units	-	1	05/31/18 17:06	H
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	**Date Collected:**	05/30/18 14:20
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF5	**Basis:**	NA
Lab Code:	K1805095-003		

General Chemistry Parameters

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	**Date Collected:**	05/30/18 12:40
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF7R	**Basis:**	NA
Lab Code:	K1805095-004		

General Chemistry Parameters

Analyte Name	Analysis Method	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	
pH	SM 4500-H+ B	**6.57**	pH Units	-	1	05/31/18 17:08	H
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	**Date Collected:**	05/30/18 12:40
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF7R	**Basis:**	NA
Lab Code:	K1805095-004		

General Chemistry Parameters

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	

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

General Chemistry Parameters

Analyte Name	Analysis Method	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	
pH	SM 4500-H+ B	**6.15**	pH Units	-	1	05/31/18 17:10	H
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	**Date Collected:**	05/30/18 13:10
Sample Matrix:	Ground Water	**Date Received:**	05/31/18 13:30
Sample Name:	053018-CCR-LPLF8	**Basis:**	NA
Lab Code:	K1805095-005		

General Chemistry Parameters

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	**Date Received:**	05/31/18 13:30
Sample Name:	FD	**Basis:**	NA
Lab Code:	K1805095-006		

General Chemistry Parameters

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	
pH	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	

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:	FD	**Basis:**	NA
Lab Code:	K1805095-006		

General Chemistry Parameters

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

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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:	Method Blank	**Basis:**	NA
Lab Code:	KQ1807298-02		

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	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC 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
		Date Analyzed:	06/4/18
		Date Extracted:	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
Boron	0.351	0.762	0.500	82	75-125
Calcium	499	496	10.0	-33 #	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.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC 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
		Date Analyzed:	06/04/18

Replicate Sample Summary

Total Metals

Sample Name:	053018-CCR-LPLF2R	**Units:**	mg/L
Lab Code:	K1805095-002	**Basis:**	NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample KQ1807298-03 Result	Average	RPD	RPD Limit
Boron	6010C	0.021	0.351	0.340	0.346	3	20
Calcium	6010C	0.21	499	484	492	3	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.

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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	Analytical Method	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:	Method Blank	**Basis:**	NA
Lab Code:	K1805095-MB1		

General Chemistry Parameters

Analyte Name	Analysis Method	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:	Method Blank	**Basis:**	NA
Lab Code:	K1805095-MB1		

General Chemistry Parameters

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:**	K1805095
Project:	LPLF CCR	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	K1805095-MB2		

General Chemistry Parameters

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	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC 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
		Date Analyzed:	06/8/18
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Sulfate

Sample Name:	053018-CCR-LPLF2R	**Units:**	mg/L
Lab Code:	K1805095-002	**Basis:**	NA
Analysis Method:	9056A		
Prep Method:	None		

		Matrix Spike			**Duplicate Matrix Spike**					
		K1805095-002MS			K1805095-002DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**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.

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
		Date Analyzed:	05/31/18

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	053018-CCR-LPLF2R	**Units:**	pH Units
Lab Code:	K1805095-002	**Basis:**	NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample K1805095-002DUP Result	Average	RPD	RPD 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.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC 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
		Date Analyzed:	06/01/18 - 06/08/18

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	053018-CCR-LPLF2R	**Units:**	mg/L
Lab Code:	K1805095-002	**Basis:**	NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample K1805095-002DUP Result	Average	RPD	RPD Limit
Solids, Total Dissolved	SM 2540 C	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.

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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	Analytical Method	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

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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

August 24, 2018 Service Request No:K1807488

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

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
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Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

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

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/DLCS).

Sample Receipt:

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 4ºC upon receipt at the laboratory.

Metals:

No significant anomalies were noted with this analysis.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by _____ Date 08/24/2018

SAMPLE DETECTION SUMMARY

CLIENT ID: 080918-CCR-LPLF2R			Lab ID: K1807488-001			
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 ID: K1807488-002			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Sulfate	2520			100	mg/L	9056A

Sample Receipt Information

ALS Environmental—Kelso Laboratory
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www.alsglobal.com

Client: Transalta Centralia Mining, LLC **Service Request:**K1807488
Project: LPLF CCR

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

K1807488

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

Part of the ALS Group A Campbell Brothers Limited Company

Work Order No.: 80819

Chain of Custody

Project Manager:	Bill Scheer		**Bill to:**	Bill Scheer	
Client Name:	TransAlta Centralia Mining Company		**Company:**	TransAlta Centralia Mining	
Address:	913 Big Hanaford Road		**Address:**	913 Big Hanaford Road	
City, State ZIP:	Centralia, WA 98531		**City, State ZIP:**	Centralia, WA 98531	
Email:	bill_scheer@transalta.com	**Phone:** 360-330-2332	**Email:**	bill_scheer@transalta.com	**po#**
Project Name:	LPLF CCR				
Project Number:					
P.O. Number:	4700075456 Line90				
Sampler's Name:	Bill Scheer				

SAMPLE RECEIPT

Temperature (°C):		Temp Blank Present		
Received Intact:	Yes	No	N/A	Wet Ice / Blue Ice
Cooler Custody Seals:	Yes	No	N/A	Total Containers:
Sample Custody Seals:	Yes	No	N/A	

REQUESTED ANALYSIS

TAT

- ☐ Routine 21day
- ☐ Same Day 100%
- ☐ Next Day ***
- ☐ 3 Day
- ☐ 5 Day 50%

Surcharges. Please call for availability

Due Date:

Sample Identification	Matrix	Date Sampled	Time Sampled	Lab ID	No. of Containers	SM 4500-H + B / pH	904.0 / Radium 228	SM 2540 C / TDS	7470A / Hg T	9056A / Chloride	9056A / F	9056A / SO4	6010C / Metals T	6020A / Metals T	903.0 Radium 226	Comments
080918-CCR-LPLF2R	GW	08/09/2018	8:45		2			X					X	X		Boron and Calcium needed
080918-CCR-LPLF8	GW	08/09/2018	9:20		1							X				Sulfate

Dissolved	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr
Total	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr

Additional Methods Available Upon Request

RELINQUISHED BY			RECEIVED BY		
Print Name	Signature	Date/Time	Print Name	Signature	Date/Time
William Scheer		08/09/2018	R Morrow	ALS	8/9/18 1410

PC KC

Cooler Receipt and Preservation Form

Client TransAlta Service Request K18 07488

Received: 8/9/18 Opened: 8/9/18 By: [signature] Unloaded: 8/9/18 By: [signature]

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 (Y) N If yes, how many and where? 1 Front
   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. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number (NA)	Filed
1.9	1.8	N/A	N/A	-0.1	352			

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* (*Gel Packs*) *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA (Y) 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 (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

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	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/EnvironmentalLaboratoryAccreditation/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	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	Modified
MCL	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.

Client:	Transalta Centralia Mining, LLC	**Service Request:**	K1807488
Project:	LPLF CCR		

Sample Name:	080918-CCR-LPLF2R	**Date Collected:**	08/9/18
Lab Code:	K1807488-001	**Date Received:**	08/9/18
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	JHINSON	AMCKORNEY
SM 2540 C		JMADISON

Sample Name:	080918-CCR-LPLF8	**Date Collected:**	08/9/18
Lab Code:	K1807488-002	**Date Received:**	08/9/18
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
9056A		MRODRIGUEZ

Sample Results

ALS Environmental—Kelso Laboratory
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Metals

ALS Environmental—Kelso Laboratory
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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:	080918-CCR-LPLF2R	**Basis:**	NA
Lab Code:	K1807488-001		

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

General Chemistry Parameters

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	**Date Collected:**	08/09/18 09:20
Sample Matrix:	Water	**Date Received:**	08/09/18 14:10
Sample Name:	080918-CCR-LPLF8	**Basis:**	NA
Lab Code:	K1807488-002		

General Chemistry Parameters

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

QC Summary Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
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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:**	K1807488
Project:	LPLF CCR	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1810901-04		

Total Metals

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	

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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	Analytical Method	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

ALS Environmental—Kelso Laboratory
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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:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	K1807488-MB1		

General Chemistry Parameters

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:	Method Blank	**Basis:**	NA
Lab Code:	K1807488-MB1		

General Chemistry Parameters

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:	Method Blank	**Basis:**	NA
Lab Code:	K1807488-MB2		

General Chemistry Parameters

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	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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

November 02, 2018 Service Request No:K1810468

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

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
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Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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/DLCS).

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 4ºC upon receipt at the laboratory.

Metals:

No significant anomalies were noted with this analysis.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by _____ Date 11/02/2018

SAMPLE DETECTION SUMMARY

CLIENT ID: 102418-CCR-LPLF1			Lab ID: K1810468-001			
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
pH	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
pH	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
pH	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
pH	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			Lab ID: K1810468-005			
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
pH	6.02				pH Units	SM 4500-H+ B
Sulfate	2530			100	mg/L	9056A
Boron	0.940			0.021	mg/L	6010C
Calcium	364			0.021	mg/L	6010C

Sample Receipt Information

ALS Environmental—Kelso Laboratory
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www.alsglobal.com

Client: Transalta Centralia Mining, LLC **Service Request:**K1810468
Project: LPLF CCR

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
K1810468-001	102418-CCR-LPLF1	10/24/2018	0925
K1810468-002	053018-CCR-LPLF2R	10/24/2018	1155
K1810468-003	FD	10/24/2018	
K1810468-004	102418-CCR-LPLF7R	10/24/2018	0950
K1810468-005	053018-CCR-LPLF8	10/24/2018	1030

K1810468

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 Scheer		**Bill to:**	Bill Scheer	
Client Name:	TransAlta Centralia Mining Company		**Company:**	TransAlta Centralia Mining	
Address:	913 Big Hanaford Road		**Address:**	913 Big Hanaford Road	
City, State ZIP:	Centralia, WA 98531		**City, State ZIP:**	Centralia, WA 98531	
Email:	bill_scheer@transalta.com	**Phone:** 360-330-2332	**Email:**	bill_scheer@transalta.com	**po#**
Project Name:	LPLF CCR				
Project Number:					
P.O. Number:	4700075456 Line90				
Sampler's Name:	Bill Scheer				

SAMPLE RECEIPT

Temperature (°C):		Temp Blank Present		
Received Intact:	Yes	No	N/A	Wet Ice / Blue Ice
Cooler Custody Seals:	Yes	No	N/A	Total Containers:
Sample Custody Seals:	Yes	No	N/A	

REQUESTED ANALYSIS

TAT

- ☐ Routine 21day
- ☐ Same Day 100%
- ☐ Next Day ***
- ☐ 3 Day
- ☒ 5 Day 50%

Surcharges. Please call for availability

Due Date:

Sample identification	Matrix	Date Sampled	Time Sampled	Lab ID	No. of Containers		Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Comments
102418 - CCR - LPLF1	GW	10/24/2018	9:25		3		X	X	X	X	X	X	X	
053018 - CCR - LPLF2R	GW	10/24/2018	11:55		3		X	X	X	X	X	X	X	MS/MSD
FD	GW				3		X	X	X	X	X	X	X	
102418 - CCR - LPLF7R	GW	10/24/2018	9:50		9		X	X	X	X	X	X	X	
053018 - CCR - LPLF8	GW	10/24/2018	10:30		3		X	X	X	X	X	X	X	

Comments

Dissolved	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr
Total	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr

Additional Methods Available Upon Request

RELINQUISHED BY			RECEIVED BY		
Print Name	Signature	Date/Time	Print Name	Signature	Date/Time
William Scheer		10/25/2018	Cody Graves		10/25/18 1410

PC KC

Cooler Receipt and Preservation Form

Client Transalta 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) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 1 Front
   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. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number (NA)	Filed
-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.)? NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA (Y) 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 (Y) N CG 10/25
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y (N)
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:
10248CCR-LPLF2R	053018-CCR-LPLF2R	Elimination
10248-CCR-LPLF8	053018-CCR-LPLF8	Elimination

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time
10248-CCR-LPLF7R	1-250ml P				X	HNO_3	0.5ml	RE1-48-4	CG	1420

Notes, Discrepancies, & Resolutions: Received 3X volume for LPLF7R
COC comment says MS/MSD on LPLF2R.

RUSH

SHORT HOLD TIME

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	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/EnvironmentalLaboratoryAccreditation/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	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	Modified
MCL	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.

Client: Transalta Centralia Mining, LLC **Service Request:** K1810468
Project: LPLF CCR

Sample Name: 102418-CCR-LPLF1 **Date Collected:** 10/24/18
Lab Code: K1810468-001 **Date Received:** 10/25/18
Sample Matrix: Ground Water

Analysis Method	Extracted/Digested By	Analyzed By
6010C	JHINSON	EMCALLISTER
9056A		MVALVERDE
SM 2540 C		JMADISON
SM 4500-H+ B		DBRADBURY

Sample Name: 053018-CCR-LPLF2R **Date Collected:** 10/24/18
Lab Code: K1810468-002 **Date Received:** 10/25/18
Sample Matrix: Ground Water

Analysis Method	Extracted/Digested By	Analyzed By
6010C	JHINSON	EMCALLISTER
9056A		MVALVERDE
SM 2540 C		JMADISON
SM 4500-H+ B		DBRADBURY

Sample Name: FD **Date Collected:** 10/24/18
Lab Code: K1810468-003 **Date Received:** 10/25/18
Sample Matrix: Ground Water

Analysis Method	Extracted/Digested By	Analyzed By
6010C	JHINSON	EMCALLISTER
9056A		MVALVERDE
SM 2540 C		JMADISON
SM 4500-H+ B		DBRADBURY

Sample Name: 102418-CCR-LPLF7R **Date Collected:** 10/24/18
Lab Code: K1810468-004 **Date Received:** 10/25/18
Sample Matrix: Ground Water

Analysis Method	Extracted/Digested By	Analyzed By
6010C	JHINSON	EMCALLISTER

Client:	Transalta Centralia Mining, LLC	**Service Request:**	K1810468
Project:	LPLF CCR		

Sample Name:	102418-CCR-LPLF7R	**Date Collected:**	10/24/18
Lab Code:	K1810468-004	**Date Received:**	10/25/18
Sample Matrix:	Ground Water		

Analysis Method	Extracted/Digested By	Analyzed By
9056A		MVALVERDE
SM 2540 C		JMADISON
SM 4500-H+ B		DBRADBURY

Sample Name:	053018-CCR-LPLF8	**Date Collected:**	10/24/18
Lab Code:	K1810468-005	**Date Received:**	10/25/18
Sample Matrix:	Ground Water		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	JHINSON	EMCALLISTER
9056A		MVALVERDE
SM 2540 C		JMADISON
SM 4500-H+ B		DBRADBURY

Sample Results

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
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www.alsglobal.com

Metals

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

Analytical Report

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

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Date Extracted	Q
Boron	6010C	**0.561**	mg/L	0.021	1	10/30/18 10:09	10/26/18	
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:	053018-CCR-LPLF2R	**Basis:**	NA
Lab Code:	K1810468-002		

Total Metals

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	**Date Received:**	10/25/18 14:10
Sample Name:	FD	**Basis:**	NA
Lab Code:	K1810468-003		

Total Metals

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	**Date Collected:**	10/24/18 09:50
Sample Matrix:	Ground Water	**Date Received:**	10/25/18 14:10
Sample Name:	102418-CCR-LPLF7R	**Basis:**	NA
Lab Code:	K1810468-004		

Total Metals

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	**Date Collected:**	10/24/18 10:30
Sample Matrix:	Ground Water	**Date Received:**	10/25/18 14:10
Sample Name:	053018-CCR-LPLF8	**Basis:**	NA
Lab Code:	K1810468-005		

Total Metals

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	**Date Collected:**	10/24/18 09:25
Sample Matrix:	Ground Water	**Date Received:**	10/25/18 14:10
Sample Name:	102418-CCR-LPLF1	**Basis:**	NA
Lab Code:	K1810468-001		

General Chemistry Parameters

Analyte Name	Analysis Method	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	
pH	SM 4500-H+ B	**6.73**	pH Units	-	1	10/25/18 18:06	H
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	**Date Collected:**	10/24/18 09:25
Sample Matrix:	Ground Water	**Date Received:**	10/25/18 14:10
Sample Name:	102418-CCR-LPLF1	**Basis:**	NA
Lab Code:	K1810468-001		

General Chemistry Parameters

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	**Date Collected:**	10/24/18 11:55
Sample Matrix:	Ground Water	**Date Received:**	10/25/18 14:10
Sample Name:	053018-CCR-LPLF2R	**Basis:**	NA
Lab Code:	K1810468-002		

General Chemistry Parameters

Analyte Name	Analysis Method	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	
pH	SM 4500-H+ B	**6.41**	pH Units	-	1	10/25/18 18:08	H
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:	053018-CCR-LPLF2R	**Basis:**	NA
Lab Code:	K1810468-002		

General Chemistry Parameters

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	

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
Sample Name:	FD	**Basis:**	NA
Lab Code:	K1810468-003		

General Chemistry Parameters

Analyte Name	Analysis Method	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	
pH	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	

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
Sample Name:	FD	**Basis:**	NA
Lab Code:	K1810468-003		

General Chemistry Parameters

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	

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

General Chemistry Parameters

Analyte Name	Analysis Method	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	
pH	SM 4500-H+ B	**6.46**	pH Units	-	1	10/25/18 18:15	H
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	**Date Collected:**	10/24/18 09:50
Sample Matrix:	Ground Water	**Date Received:**	10/25/18 14:10
Sample Name:	102418-CCR-LPLF7R	**Basis:**	NA
Lab Code:	K1810468-004		

General Chemistry Parameters

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	

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

General Chemistry Parameters

Analyte Name	Analysis Method	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	
pH	SM 4500-H+ B	**6.02**	pH Units	-	1	10/25/18 18:19	H
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	**Date Collected:**	10/24/18 10:30
Sample Matrix:	Ground Water	**Date Received:**	10/25/18 14:10
Sample Name:	053018-CCR-LPLF8	**Basis:**	NA
Lab Code:	K1810468-005		

General Chemistry Parameters

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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Metals

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www.alsglobal.com

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

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	

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
		Date Analyzed:	10/30/18
		Date Extracted:	10/26/18

Matrix Spike Summary
Total Metals

Sample Name:	102418-CCR-LPLF7R	**Units:**	mg/L
Lab Code:	K1810468-004	**Basis:**	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
Calcium	196	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.

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
		Date Analyzed:	10/30/18

Replicate Sample Summary
Total Metals

Sample Name:	102418-CCR-LPLF7R	**Units:**	mg/L
Lab Code:	K1810468-004	**Basis:**	NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample KQ1815562-03 Result	Average	RPD	RPD Limit
Boron	6010C	0.021	0.340	0.342	0.341	<1	20
Calcium	6010C	0.021	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.

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

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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	Analytical Method	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

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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:	Method Blank	**Basis:**	NA
Lab Code:	K1810468-MB1		

General Chemistry Parameters

Analyte Name	Analysis Method	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:	Method Blank	**Basis:**	NA
Lab Code:	K1810468-MB1		

General Chemistry Parameters

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:	Method Blank	**Basis:**	NA
Lab Code:	K1810468-MB2		

General Chemistry Parameters

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:	Method Blank	**Basis:**	NA
Lab Code:	K1810468-MB3		

General Chemistry Parameters

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:	Method Blank	**Basis:**	NA
Lab Code:	K1810468-MB4		

General Chemistry Parameters

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	

ALS Group USA, Corp.
dba ALS Environmental

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: 102418-CCR-LPLF7R
Lab Code: K1810468-004

Units:mg/L
Basis:NA

			Matrix Spike K1810468-004MS			Duplicate Matrix Spike K1810468-004DMS					
Analyte Name	**Method**	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**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.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC 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
		Date Analyzed:	10/31/18

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	102418-CCR-LPLF7R	**Units:**	mg/L
Lab Code:	K1810468-004	**Basis:**	NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample K1810468-004DUP Result	Average	RPD	RPD 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.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC 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
		Date Analyzed:	10/25/18

Replicate Sample Summary

General Chemistry Parameters

Sample Name:	102418-CCR-LPLF7R	**Units:**	pH Units
Lab Code:	K1810468-004	**Basis:**	NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample K1810468-004DUP Result	Average	RPD	RPD Limit
pH	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.

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Transalta Centralia Mining, LLC	**Service Request:**	K1810468
Project:	LPLF CCR	**Date Analyzed:**	10/31/18
Sample Matrix:	Ground Water	**Date Extracted:**	NA

Lab Control Sample Summary
Solids, Total Dissolved

Analysis Method:	SM 2540 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	613152

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1810468-LCS2	508	523	97	85-115

January 11, 2019 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

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ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Kelso Laboratory
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ALS Environmental

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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/DLCS).

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 4ºC upon receipt at the laboratory.

Metals:

No significant anomalies were noted with this analysis.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by _____ Date 01/11/2019

SAMPLE DETECTION SUMMARY

CLIENT ID: 010719-CCR-LPLF2R			Lab ID: K1900152-001			
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 ID: K1900152-002			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Chloride	9.23			0.20	mg/L	9056A

Sample Receipt Information

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www.alsglobal.com

Client: Transalta Centralia Mining, LLC **Service Request:**K1900152
Project: LPLF CCR

SAMPLE CROSS-REFERENCE

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

K1900152

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

Part of the ALS Group A Campbell Brothers Limited Company

Work Order No.: 80819

Chain of Custody

Project Manager:	Bill Scheer		**Bill to:**	Bill Scheer	
Client Name:	TransAlta Centralia Mining Company		**Company:**	TransAlta Centralia Mining	
Address:	913 Big Hanaford Road		**Address:**	913 Big Hanaford Road	
City, State ZIP:	Centralia, WA 98531		**City, State ZIP:**	Centralia, WA 98531	
Email:	bill_scheer@transalta.com	**Phone:** 360-330-2332	**Email:**	bill_scheer@transalta.com	**po#**
Project Name:	LPLF CCR				
Project Number:					
P.O. Number:	4700075456 Line90				
Sampler's Name:	Bill Scheer				

SAMPLE RECEIPT

Temperature (°C):		Temp Blank Present			
Received Intact:	Yes	No	N/A	Wet Ice / Blue Ice	
Cooler Custody Seals:	Yes	No	N/A	Total Containers:	
Sample Custody Seals:	Yes	No	N/A		

REQUESTED ANALYSIS

TAT

- ☐ Routine 21day
- ☐ Same Day 100%
- ☐ Next Day ***
- ☐ 3 Day
- ☒ 5 Day 50%

Surcharges. Please call for availability

Due Date:

Sample Identification	Matrix	Date Sampled	Time Sampled	Lab ID	No. of Containers		SM 4500-H + B / pH	904.0 / Radium 228	SM 2540 C / TDS	7470A / Hg T	9056A / Chloride	9056A / F	9056A / SO4	6010C / Metals T	6020A / Metals T	903.0 Radium 226	Comments
010719-CCR-LPLF2R	GW	01/07/2019	14:15		3				X				X	X	X		Boron and Calcium needed
010719-CCR-LPLF7R	GW	01/07/2019	14:55		1						X						Chloride

Dissolved	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr
Total	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Tl, V, Zn, Zr

Additional Methods Available Upon Request

RELINQUISHED BY			RECEIVED BY		
Print Name	Signature	Date/Time	Print Name	Signature	Date/Time
William Scheer		01/07/2019			1/7/19 1605

PC Libby

Cooler Receipt and Preservation Form

Client Trans Alta Service Request *K19* 00152

Received: 1/7/19 Opened: 1/7/19 By: [signature] Unloaded: 1/7/19 By: [signature]

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 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. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number (NA)	Filed
0.5	0.4	-	-	-0.1	349			

4. Packing material: *Inserts* (*Baggies*) *Bubble Wrap* (*Gel Packs*) *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA (Y) 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 (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: SHORT HOLD TIME

RUSH

4 containers for -001, not 3.

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	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/EnvironmentalLaboratoryAccreditation/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	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	Modified
MCL	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.

Client:	Transalta Centralia Mining, LLC	**Service Request:**	K1900152
Project:	LPLF CCR/		

Sample Name:	010719-CCR-LPLF2R	**Date Collected:**	01/7/19
Lab Code:	K1900152-001	**Date Received:**	01/7/19
Sample Matrix:	Ground Water		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	JHINSON	AMCKORNEY
9056A		MRODRIGUEZ
SM 2540 C		JMADISON

Sample Name:	010719-CCR-LPLF7R	**Date Collected:**	01/7/19
Lab Code:	K1900152-002	**Date Received:**	01/7/19
Sample Matrix:	Ground Water		

Analysis Method	Extracted/Digested By	Analyzed By
9056A		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	**Date Collected:**	01/07/19 14:15
Sample Matrix:	Ground Water	**Date Received:**	01/07/19 16:05
Sample Name:	010719-CCR-LPLF2R	**Basis:**	NA
Lab Code:	K1900152-001		

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	**Date Collected:**	01/07/19 14:15
Sample Matrix:	Ground Water	**Date Received:**	01/07/19 16:05
Sample Name:	010719-CCR-LPLF2R	**Basis:**	NA
Lab Code:	K1900152-001		

General Chemistry Parameters

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	**Date Collected:**	01/07/19 14:15
Sample Matrix:	Ground Water	**Date Received:**	01/07/19 16:05
Sample Name:	010719-CCR-LPLF2R	**Basis:**	NA
Lab Code:	K1900152-001		

General Chemistry Parameters

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	**Date Collected:**	01/07/19 14:55
Sample Matrix:	Ground Water	**Date Received:**	01/07/19 16:05
Sample Name:	010719-CCR-LPLF7R	**Basis:**	NA
Lab Code:	K1900152-002		

General Chemistry Parameters

Analyte Name	Analysis 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:	Method Blank	**Basis:**	NA
Lab Code:	KQ1900246-02		

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	

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dba ALS Environmental

QA/QC Report

Client:	Transalta Centralia Mining, LLC	**Service Request:**	K1900152
Project:	LPLF CCR	**Date Collected:**	01/07/19
Sample Matrix:	Ground Water	**Date Received:**	01/07/19
		Date Analyzed:	01/9/19
		Date Extracted:	01/8/19

Matrix Spike Summary
Total Metals

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
Boron	0.332	0.728	0.500	79	75-125
Calcium	456	464	10.0	81 #	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.

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QA/QC Report

Client:	Transalta Centralia Mining, LLC	**Service Request:**	K1900152
Project	LPLF CCR	**Date Collected:**	01/07/19
Sample Matrix:	Ground Water	**Date Received:**	01/07/19
		Date Analyzed:	01/09/19

Replicate Sample Summary
Total Metals

Sample Name:	010719-CCR-LPLF2R	**Units:**	mg/L
Lab Code:	K1900152-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample KQ1900246-03 Result	Average	RPD	RPD Limit
Boron	6010C	0.021	0.332	0.326	0.329	2	20
Calcium	6010C	0.021	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.

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

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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	Analytical Method	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:	Method Blank	**Basis:**	NA
Lab Code:	K1900152-MB		

General Chemistry Parameters

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:	Method Blank	**Basis:**	NA
Lab Code:	K1900152-MB		

General Chemistry Parameters

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	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	Transalta Centralia Mining, LLC	**Service Request:**	K1900152
Project	LPLF CCR	**Date Collected:**	01/07/19
Sample Matrix:	Ground Water	**Date Received:**	01/07/19
		Date Analyzed:	01/08/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	010719-CCR-LPLF2R	**Units:**	mg/L
Lab Code:	K1900152-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample K1900152-001DUP Result	Average	RPD	RPD 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.

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QA/QC Report

Client: Transalta Centralia Mining, LLC
Project: LPLF CCR
Sample 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	Analytical Method	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