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Technical Report Overview

Report: 2018 Regional Groundwater Monitoring Program Annual Report

Overview: This report presents the 2018 results of the regional groundwater monitoring program required under Permit 107517. This report summarizes the results of groundwater quality in 2018 and compares groundwater chemistry to nearby surface water chemistry to understand groundwater transport pathways.

This report was prepared for Teck by SNC-Lavalin Inc.

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2018 Regional Groundwater Monitoring Program Annual Report

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Executive Summary

This 2018 Annual Report meets reporting requirements for regional groundwater monitoring in the Elk Valley as outlined in Section 10.4 of Permit 107517 (as amended on August 25, 2018). The Elk Valley Regional Groundwater Monitoring Program (RGMP) started in 2015 and consists of data from selected locations in the following groundwater monitoring programs:

- Fording River Operations (FRO);
- Greenhills Operations (GHO);
- Line Creek Operations (LCO);
- Elkview Operations (EVO);
- Coal Mountain Operations (CMO); and
- the Regional Drinking Water Sampling Program (RDW).

The RGMP focuses on twelve areas ("Study Areas") for the Elk Valley described most recently in the 2017 RGMP Update. This 2018 Annual Report for the RGMP has been prepared following the approved 2015 RGMP and incorporates feedback received from the Environmental Monitoring Committee (EMC), Groundwater Working Group (GWG), and the Ministry of Environment & Climate Change Strategy (ENV) on numerous reports.

Quarterly samples were collected from wells included in the RGMP Update with the exception of Q1 samples from FR_HMW5 (Background Study Area) due to frozen water in the well and FR_09-01-A (Study Area 1) due to a dry well. Samples from site-specific programs were analyzed for parameters on the analyte list except: two parameters in two wells in Study Area 2 in Q1; one field parameter in a domestic well in Study Area 4; fifteen parameters in one well in Study Areas 5/6 in Q1-3; and one parameter in three wells in Study Area 9 in Q2. Quarterly manual groundwater level measurements were collected at RGMP wells with the exception of FR_HMW5 in Q1 (Background Study Area). These modifications to the RGMP do not impact the overall quality or interpretation of the data.

Groundwater quality was compared to applicable primary and secondary screening criteria. Discussion of trends as well as interpretation of water levels and selected parameters were completed by Study Area. To assess groundwater and surface water interaction and increase our understanding of groundwater transport pathways, groundwater chemistry was compared to chemistry at nearby surface water stations.

In general, groundwater results in 2018 were relatively similar to previous years. Concentrations of Constituents of Interest (CI; nitrate-N, sulphate, dissolved cadmium, and dissolved selenium) above primary and secondary screening criteria were generally consistent with previous observations and are summarized by Study Area within the report. The following exceptions were noted.

- Background Study Area: Although concentrations in background wells were less than screening criteria, increasing trends of CI were measured in FR_HMW5. Continued monitoring of this well will be conducted to confirm these trends. Concurrently, a review of the reference well monitoring network will be conducted in 2019 as part of the groundwater trigger work for the Adaptive Management Plan (AMP); a replacement well in a suitable location is planned to be drilled in 2020.
- Study Area 3: Dissolved selenium at GH_POTW17 and GH_POTW09 increased to historical highs in Q2 and Q3, respectively, and subsequently decreased to below primary screening criteria, consistent with historical results. This may have resulted from a surface water connection with Greenhills Creek.

- Study Area 4: Groundwater near Leask Creek (GH_GA-MW-4) has been more recently influenced by infiltration of the Elk River and less by mine-influenced surface water from Leask Creek/Pond, suggesting that down-valley transport of mine-influenced groundwater from this area is of decreased importance. Since Q3 2017, groundwater near Wolfram Creek (GH_GA-MW-2) appears to be more influenced by mine-influenced surface water compared to previous years.

Non-order constituents in groundwater with concentrations greater than primary screening criteria included chloride, fluoride, dissolved barium, boron, chromium, copper, lithium, manganese, molybdenum, strontium, and sodium. These were considered to originate from natural sources (e.g., interaction with bedrock or unconsolidated materials), with the exception of dissolved copper concentrations in monitoring well GH_GA-MW-1 which may originate from copper fittings in the well that will be replaced in 2019. It is recognized that a list of mining-related constituents was developed as part of the surface water early warning trigger development under the AMP; a review of non-order constituents will be conducted as part of the groundwater trigger development under the AMP.

Recommendations for the RGMP were as follows:

- Once approved, implement the 2017 RGMP Update;
- Complete hydraulic conductivity testing at GH_MW-RLP-1D;
- Monitor pumping rates and water levels in supply wells GH_POTW09, GH_POTW10, GH_POTW15, and GH_POTW17 at GHO upon completion of an assessment of the feasibility of installing dataloggers;
- A re-survey of the wells at CMO to top of pipe casing should be completed;
- If concentrations of Cl at EV_RCgw remain elevated, additional investigations may be required to determine the possible source and spatial extent of the elevated Cl; and
- Replace the reference well FR_HMW5 as a reference well under the RGMP as continual increases in sulphate and dissolved selenium were measured. The location of a suitable replacement well should follow a holistic review of background monitoring locations in the Elk Valley. In the meantime, FR_HMW5 should continue to be monitored.

Monitoring and Sampling Procedures:

- When possible, collect samples at least 60 days after the last sampling event;
- For nested wells, monitor wells on the same day, one right after the other, and collect manual depth to groundwater measurements prior to purging either well rather than purging and sampling one well and then moving to the well pair;
- Implement the new data logger deployment procedures to ensure that continuous water level measurements are properly obtained from select monitoring wells;
- Ensure all parameters stabilize before sampling and avoid sampling if bubbles present in tubing;
- Review sampling procedures to minimize potential contamination when collecting samples and handling field blanks;
- Field filter and preserve groundwater samples for analysis of dissolved metals and dissolved organic carbon (DOC);
- Ensure that one trip blank is included for each sampling event; and,
- Attempt to collect field and trip blanks from locations associated with both the RGMP and other associated programs (e.g., Site-specific Groundwater Monitoring Program and/or Regional Drinking Water Program).

Sample Submission, Analysis, and Quality Assurance/Quality Control (QA/QC):

- Analyze samples (including duplicates, trip, and field blanks) for parameters listed in the 2017 RGMP Update once approved;
- Continue discussions with the laboratory on the best procedures to minimize hold-time exceedances; and
- Complete a QA/QC on laboratory results as they come in to identify hold-time and other errors that may arise in order to rectify them in the subsequent sampling event.

Data gaps identified in the 2017 RGMP Update in relation to 2018 monitoring data as well as new monitoring wells installed in 2018 and 2019 are discussed in the report. Data gaps identified for Study Areas 1, 4, and 9 are anticipated to be addressed based on preliminary data.

Table of Contents

Table of Contents (Cont'd)

Table of Contents (Cont'd)

Table of Contents (Cont'd)

In-Text Tables

Table of Contents (Cont'd)

Tables

Drawings

Table of Contents (Cont'd)

Drawings (Cont'd)

Appendices

Table of Contents (Cont'd)

Appendices (Cont'd)

Acronyms

ALS	ALS Laboratory
AMP	Adaptive Management Plan
AW	Aquatic Life Water Use
BC	British Columbia
BCWQG	*British Columbia Approved Water Quality Guidelines, includes Working Water Quality Guidelines for BC* (BCWQG). British Columbia Ministry of Environment & Climate Change Strategy, updated March 2018.
CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers for the Environment
CI	Constituents of interest
CMO	Coal Mountain Operations
COA	Certificate of Analyses
CP	Compliance Point
CSM	Conceptual Site Model
CSR	*Contaminated Sites Regulation* (CSR), B.C. Reg. 375/96, includes amendments up to B.C. Reg. 13/2019, January 24, 2019.
DCWMS	Dry Creek Water Management System
DI	De-ionized
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
DW	Drinking Water Use
EMA	Environmental Management Act
EMC	Environmental Monitoring Committee
EMS	Environmental Monitoring System
ENV	Ministry of Environment & Climate Change Strategy
EVO	Elkview Operations
EVWQP	Elk Valley Water Quality Plan
FRO	Fording River Operations
GHO	Greenhills Operations
GCDWQ	Guidelines for Canadian Drinking Water Quality
GWG	Groundwater Working Group
IW	Irrigation Water Use
KU	Key Uncertainty (part of the AMP)
LAEMP	Local Aquifer Effects Monitoring Program

Acronyms (Cont'd)

LCO	Line Creek Operations
LW	Livestock Water Use
m	Metres
masl	Metre(s) above sea level
mbgs	Metre(s) below ground surface
MDL	Method Detection Limit
MQ	Management Question
MU	Management Unit
ORP	Oxidation-reduction Potential
Q1, Q2, Q3, Q4	First Quarter, Second Quarter, Third Quarter, Fourth Quarter
QA/QC	Quality Assurance/Quality Control
RDW	Regional Drinking Water Sampling Program
RGMP	Regional Groundwater Monitoring Program
RWQM	Regional Water Quality Model
SP&P	Standard Practices and Procedures
SPO	Site Performance Objective
STP	South Tailings Pond
SSGMP	Site-Specific Groundwater Monitoring Program
TDS	Total Dissolved Solids
TG	Technical Guidance
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TSS	Total Suspended Solids

1 Introduction

This report meets the annual reporting requirements for Teck Coal Limited (Teck) for regional groundwater monitoring in the Elk Valley outlined in Permit 107517[1] issued by the Ministry of Environment & Climate Change Strategy (ENV). SNC-Lavalin Inc. (SNC-Lavalin) and Teck developed a Regional Groundwater Monitoring Program (RGMP) to monitor groundwater in the valley bottoms of defined areas within Management Units (MU) 1, 2, 3, and 4 as described in the Elk Valley Water Quality Plan (EVWQP; Teck, 2014) and shown on Drawing 661460-301.

Using the framework of the EVWQP, Teck has developed three purpose statements and supporting objectives for the RGMP (SNC-Lavalin, 2017a):

1: monitor and evaluate potential quality effects to groundwater resources from mining activities to protect current groundwater users (initial focus) in the Elk Valley. Monitoring and evaluations will continue to inform management decisions that work towards protection of future groundwater users in the Elk Valley.
2: monitor and evaluate groundwater as a potential pathway for transport of mine-related constituents of interest to surface water to support management decisions under the Water Quality Adaptive Management Plan (AMP).
3: evaluate and refine the conceptual site model for source, transport and fate of mine-related constituents of interest in groundwater in the Elk Valley.

The RGMP currently monitors twelve areas, referred to as “Study Areas”, to understand potential regional groundwater pathways of mine-related constituents including selenium, cadmium, sulphate, and nitrate, or “constituents of interest” (hereafter referred to as CI). These areas are defined based on identified receptors and source and transport pathway information from Site-specific Groundwater Monitoring Programs (SSGMPs) for the five operating mines in the Elk Valley (SNC-Lavalin, 2017a). The following sections describe the regulatory requirements for the RGMP (Section 1.1), linkages with other programs (Section 1.2) and recommendations and Environmental Monitoring Committee (EMC) proirity input and advice from the 2017 Annual RGMP report (Section 1.3).

1.1 Regulatory Requirements

This report fulfills reporting requirements listed in Section 10.4 of Permit 107517, specifically:

Regional groundwater monitoring results and interpretation must be compiled into a written report and submitted on an annual basis for each calendar year to the Director by May 16 of the following year. The Annual Report must include summaries of the site-specific groundwater reports.

The report(s) must include, but is not limited to:

i. A map of monitoring locations with EMS and Permittee descriptors;

ii. Cross sections showing well installation details, stratigraphy, groundwater elevations, and flow. Cross sections should be in the direction of groundwater flow and perpendicular to groundwater flow;

iii. Drawings showing locations and water quality data of groundwater sampling points;

[1] Permit 107517, amended August 25, 2018.

iv. *A summary of background information on that year's program, including discussion of program modifications relative to previous years;*

v. *A summary of measured parameters, including appropriate graphs and comparison of results to, Approved and Working Water Quality Guidelines, or other criteria and benchmarks as specified by the Director;*

vi. *If applicable, a summary of exceedances of screening benchmarks;*

vii. *Evaluation and discussion of spatial patterns and temporal trends;*

viii. *A summary of all QA/QC issues during the year; and*

ix. *Recommendations for further study or measures to be taken.*

In July 2015, an RGMP was submitted (hereafter referred to as "2015 RGMP"; SNC-Lavalin, 2015) focusing on CI. The 2015 RGMP was approved on April 18, 2017 with a number of conditions including an update to the RGMP, which was submitted on September 29, 2017 by Teck (hereafter referred to as "2017 RGMP Update"; SNC-Lavalin, 2017a). The 2017 RGMP Update (SNC-Lavalin, 2017a) has not yet been approved by ENV; however, suggested additions from the 2017 RGMP Update have been incorporated into this report for a more complete understanding. Consequently, references to the 2017 RGMP Update, including its recommendations and analyses, are presented throughout this report. A Permit requirement checklist has been included in Appendix I and identifies sections within this report where each requirement has been addressed.

1.2 Linkage between Regional and Site-Specific Programs

In addition to requirements for an RGMP, Permit 107517 requires an SSGMP at each of Teck's five coal mines in the Elk Valley: Fording River Operations (FRO); Greenhills Operations (GHO); Line Creek Operations (LCO); Elkview Operations (EVO); and Coal Mountain Operations (CMO). SSGMPs focus in on identifying and monitoring potential sources of mine-related constituents in groundwater and transport pathways to groundwater in the valley bottom of the main stem rivers (i.e., Elk and Fording Rivers, Michel Creek). The majority of site-specific groundwater monitoring occurs within mine operations permitted boundaries. The RGMP focuses on groundwater fate and transport in the valley bottom of the main stems, and how they relate to applicable receptors. Regional groundwater monitoring has been completed within and outside mine operations permitted boundaries. The RGMP also includes data from the Regional Drinking Water Sampling Program (RDW). Summaries of SSGMPs are in Appendix II.

1.3 Linkage to Adaptive Management Plan

As required in Permit 107517 Section 11, Teck has developed an AMP to support implementation of the EVWQP to achieve water quality targets including calcite targets, ensure that human health and the environment are protected, and where necessary, restored, and to facilitate continuous improvement of water quality in the Elk Valley. Following an adaptive management framework, the AMP identifies six Management Questions (MQ) that will be re-evaluated at regular intervals as part of AMP updates throughout EVWQP implementation. The AMP also identifies key uncertainties (KU) that need to be reduced to fill gaps in current understanding and support achievement of the EVWQP objectives.

The results presented in this report provide information relevant to five of the six MQs and many of the KUs identified in the AMP. Groundwater quality monitoring data along with data collected from other programs are needed for re-evaluating the answers to MQ 1 ("Will water quality limits and Site Performance Objectives (SPO) be met for selenium, nitrate, sulphate and cadmium?"), MQ 2 ("Will the aquatic ecosystem be protected by meeting the long-term SPO?"), MQ 3 ("Are the combinations of methods for controlling selenium, nitrate, sulphate and cadmium included in the implementation plan the most effective for meeting limits and SPO?"), MQ 5 ("Does monitoring indicate that mine-related changes in aquatic ecosystem conditions are consistent with expectations?"), and MQ 6 ("Is water quality being managed to be protective of human health?").

Groundwater quality monitoring data assist in reducing KU 1.2 ("How will uncertainty in the Regional Water Quality Model (RQWM) be evaluated to assess future achievement of limits and SPOs?"), KU 2.1 ("How will the science-based benchmarks be validated and updated?"), KU 2.2 ("How will the integrated assessment methodology used to derive area-based SPOs be validated and updated?"), KU 3.4 ("What additional flow and groundwater information do we need to support water quality management?"), KU 6.1. (Is our understanding of local groundwater conditions for current and future drinking water use sufficient to minimize human exposure to constituents?), KU 6.2 ("Is the spatial extent of mine-influenced groundwater sufficiently characterized to manage water quality in order to support meeting the environmental objectives of the EVWQP?"), and KU (6.3 What are appropriate groundwater-related triggers and how can they be used?). Progress on reducing these key uncertainties, and associated learnings, will be described in Annual AMP Reports. Groundwater triggers under KU 6.3 will be developed in consultation with the Groundwater Working Group (GWG) and implemented in the appropriate monitoring programs once developed.

Groundwater monitoring results relevant to MQs and KUs are discussed in Section 4.15. Refer to the AMP for more information on the adaptive management framework, MQ, KU, Response Framework, Continuous Improvement, linkages between the AMP and other EVWQP programs, and AMP reporting.

1.4 2017 RGMP Update Data Gaps

The 2017 RGMP Update identified data gaps and the need for additional studies, as well as a ranking of prioritization for filling gaps. In 2018 and early 2019, a number of new monitoring wells were drilled that will address RGMP data gaps. Also, monitoring wells were drilled as part of other programs that are anticipated to fill some of the data gaps; however, those studies have not yet been finalized and therefore results are preliminary. The data gaps as well as relevant sections in the RGMP are presented in Table A.

Table A: Data Gaps Identified for Additional Studies by Study Area

Study Area(s)	Data Gap	Section	Priority Rank
1	A down-valley groundwater transport pathway was identified where concentrations of Cl in groundwater in the Fording River valley bottom were above the Fording River surface water concentrations and primary/secondary screening criteria. The spatial extent of the valley-bottom aquifer and Cl concentrations above secondary criteria in the aquifer is not well defined.	4.3.3	2
2	No gap identified.	-	12

Table A (Cont'd): Data Gaps Identified for Additional Studies by Study Area

Study Area(s)	Data Gap	Section	Priority Rank
3	No gap identified.	-	7
4	No gap identified. A localized gap was later identified in the RGMP 2017 Annual Report (SNC-Lavalin, 2018a).	-	5
5 and 6	No data exist for the Elk River valley-bottom aquifer downgradient of LCO and as such local groundwater conditions are unknown.	4.7.3	7
7	No gap identified.	-	13
8	Groundwater quality is unknown in the shallow and deep valley-bottom aquifers near to Goddard Creek Sedimentation Pond, where surface water may be losing to ground.	4.9.3	7
9	A down-valley groundwater pathway was identified where concentrations of Cl in groundwater in the Michel Creek valley bottom were above the Fording River surface water concentrations and secondary screening criteria. The spatial extent of the aquifer and Cl concentrations above secondary screening criteria is not well defined. No data exist for the Michel Creek valley-bottom aquifer downgradient of Baldy Ridge where a number of creeks infiltrate to ground and as such deeper groundwater quality is unknown.	4.10.3	2
10	No data exist for the Michel Creek valley-bottom aquifer downgradient of Erickson Creek and the South Pit Decant Pond and as such local groundwater conditions are unknown.	4.11.3	7
11	No data exist for the Michel Creek valley-bottom aquifer downgradient of CMO loadout and as such local groundwater conditions are unknown.	4.12.3	5
12	No data exist for the Elk River and Michel valley-bottom upgradient of RG_DW-03-04. Therefore, although a surface water connection is likely, the groundwater flowpath and surface water influence is poorly understood.	4.13.3	4

1.5 2017 Annual Report Recommendations

The following recommendations were developed in the 2017 RGMP Annual Report (SNC-Lavalin, 2018a):

- Increase water level data quality by:
  - collecting concurrent (before and after) manual water level measurements each time a water level logger is deployed or removed from a well and prior to each sampling event;
  - re-deploying level logger at exact same depth in monitoring well after it was removed for downloading; and
  - using barometer and manual water level measurements to compensate and correct the data.
- Review the quality assurance/quality control (QA/QC) programs, specifically related to field and trip blanks, to evaluate the source of constituents above the detection limit;

- Review sampling protocols to confirm which parameters should be analyzed for Study Area 6; and
- For samples from RDW wells (RG_DW-series), continue to analyse for all the parameters listed in the RGMP in 2018.

These recommendations were taken into consideration for the 2018 RGMP and the following changes were made.

- Consideration was given to ensure manual water level measurements were collected before and after deploying and removing a level logger prior to each sampling event;
- Level loggers were re-deployed at the same depth in which the loggers were previously installed;
- Barometric data and manual water levels were utilized in order to compensate the data;
- A review of detectable constituents in field and trip banks was completed in conjunction with the laboratory; and
- Required analytes were analyzed in groundwater from Study Area 6, with the exception of results for select constituents in Q3, and RDW wells in 2018.

Based on the results from the 2017 RGMP Annual Report, the following additional recommendations were identified to fill gaps identified.

- Study Area 3: The supply wells have been instrumented with continuous level monitors. We recommend reviewing these data to further understand the groundwater-surface water interactions in this portion of the Fording River valley bottom.
- Study Area 4: A localized gap in the groundwater understanding was identified as a result of the historical highs at two monitoring wells.

The gap identified for Study Area 3 could not be filled as the installation of instruments with continuous level monitors could not be achieved. For the gap identified in Study Area 4, groundwater and surface water interactions in the Elk River side channel will be assessed as part of the GHO local aquatic effects monitoring program currently being undertaken.

1.5.1 2017 Annual Report Priority Advice and Input

The EMC provided priority advice and input on the 2017 RGMP Annual Report. Teck has provided responses to the priority advice and input, with the following addressed in the 2018 RGMP Annual Report:

- Priority Advice P14: correct nitrate-N primary screening criteria is applied;
- Priority Advice P15: thorough editing completed;
- Priority Advices P20 and P21: considered using more graphs to illustrate trends over time;
- Input: added to Table 2 (well installation details) information related to the equipment used for groundwater level monitoring (i.e., presence of pressure transducer in the wells or only manual measurements) and purging and sampling equipment; and
- Input: added locations and groundwater levels for monitoring well locations included in the SSGMP using distinct symbols from the RGMP monitoring wells.

2 RGMP Program

The following sections describe the monitoring program in 2018 for the RGMP. The basis for the RGMP was the groundwater conceptual site model (CSM), most recently presented in the 2017 RGMP Update (SNC-Lavalin, 2017a).

Details of the 2018 monitoring program are provided in the following subsections including Regional CSM and Study Areas, monitoring locations, and a summary of the SSGMP annual reports.

2.1 Regional Conceptual Site Model and Study Areas

The Regional CSM indicated the main potential pathway for regional groundwater transport of mine-influenced water was through the valley-bottom sediment in the main stems (i.e., Elk and Fording Rivers, and Michel Creek) with minor potential contribution through bedrock due to low permeability bedrock and the steep topographic gradient in the mountainous terrain (SNC-Lavalin, 2017a). The surficial and bedrock geology, as developed in the CSM, are indicated on Drawings 661460-302 to 661460-305. In addition, the Regional CSM identified that the principal groundwater systems of interest for transport of CI to receptors in the Elk Valley were at the local scale. Consequently, 12 areas (referred to as “Study Areas”) at the local scale (i.e., on the order of tens of metres to a few kilometres) were defined as being areas where groundwater monitoring may be required to understand potential groundwater transport of mining-related CI in the valley bottoms of the main stems. These Study Areas are summarized in Table B below and shown on Drawings 661460-306 and 661460-307.

Table B: Study Areas for Groundwater Monitoring

Study Area	Description	MU	Operation/ Program[1]
1	**Fording River Valley Bottom Downgradient of FRO, Cataract and Porter Creeks:** This area is the focal point for the majority of upland and tributary flow to the Fording River valley bottom near the FRO and GHO property boundaries, and the primary off-site migration pathway from FRO.	1	FRO
2	**Fording River Valley Bottom Downgradient of LCO Dry Creek:** This area receives drainage from the planned LCO Phase II development as well as upgradient Fording River valley-bottom groundwater from FRO and GHO.	1	LCO
3	**Fording River Valley Bottom Downgradient of GHO Rail Loop and Greenhills Creek:** This area receives upland groundwater from GHO.	1	GHO
4	**Elk River Valley Bottom Downgradient of Leask, Wolfram, and Thompson Creeks:** This area receives groundwater recharge from upgradient mining activities along the western slope of GHO and is a potential off-site migration pathway.	2	GHO/RDW
5	**Fording River Valley Bottom Downgradient of Line Creek:** The valley bottom in this area receives inputs from Line Creek, the Fording River and the LCO Process Plant.	2 and 4	LCO

Table B (Cont'd): Study Areas for Groundwater Monitoring

Study Area	Description	MU	Operation/ Program[1]
6	**Elk River Valley Bottom Downgradient of Confluence with Fording River:** This area receives input from the Fording River valley bottom, the Elk River valley bottom and the Line Creek Process Plant site.	4	LCO
7	**Elk River Valley Bottom Downgradient of Grave Creek:** This area receives input from drainages flowing from the northwest slope of EVO, as well as upgradient input from the Elk River and Study Area 6.	4	EVO/RDW
8	**Elk River Valley Bottom Downgradient of Balmer, Lindsay and Otto/Cossarini Creeks:** Upland groundwater flows into the Elk River valley bottom from potential sources along the western slope of EVO.	4	EVO
9	**Michel Creek Valley Bottom Downgradient of EVO:** Upland groundwater flows into the Michel Creek valley bottom from potential sources along the western slope of EVO.	4	EVO/RDW
10	**Michel Creek Valley Bottom Downgradient of Erickson Creek**: Mining activities on the southwest slope of EVO around Erickson Creek, are a potential source of mining-related constituents to valley-bottom groundwater into the Michel Creek valley bottom.	4	EVO
11	**Michel Creek Valley Bottom Downgradient of CMO:** The Michel Creek valley bottom receives input from CMO immediately downgradient of the confluence of Michel and Corbin Creeks. Valley-bottom deposits in this area are the primary off-site migration pathway.	4	CMO
12	**Elk River Valley Bottom at MU 4 Boundary:** This area is at the boundary of MU 4. Coarse sediment in this area has been identified as a potential migration pathway, and previous studies have inferred that there is surface water recharge from the Elk River in this area.	4	EVO/RDW

[1] Operation/Program refers to the Operation (i.e., FRO, GHO, LCO, EVO, CMO) and/or program (i.e., Operation SSGMP and RDW) that is responsible for carrying out the monitoring related to each Study Area.

2.2 Monitoring Locations and Rationale

The RGMP network that is currently approved consists of a total of 37 monitoring, supply, and/or domestic wells. The wells selected for the RGMP are an integration of the SSGMPs, the RDW and other ongoing sampling programs such as operational water supply sampling programs. Table C provides a list of locations associated with each Study Area, as well as information such as well type (monitoring, supply or domestic) and associated operation. Table C also includes a description of each well location and a rationale indicating why these wells were included in the 2015 RGMP. Drawings 661460-308 to 661460-311 indicate monitoring locations included in the 2015 RGMP in each Study Area in relation mine-permitted boundaries.

RG_DW-07-01 in Study Area 11 was previously sampled as part of the 2015 RGMP, but because this is a domestic well, the 2015 RGMP indicated that sampling of this well would be replaced by a new monitoring well network at CMO (SNC-Lavalin, 2015). In 2016, a nested monitoring well (CM_MW1) was installed approximately 450 m west of RG_DW-07-01 with screened intervals in the shallow overburden, the valley bottom, and in bedrock. Results have been included for this well in this report.

Additional details on rationale for well selection and information associated with well type are provided in the 2015 and 2017 RGMP Updates (SNC-Lavalin, 2015; SNC-Lavalin, 2017a). Borehole logs for the wells sampled as part of the RGMP are included in Appendix III. Field sampling methodologies are provided in Appendix IV.

Table C: Groundwater Monitoring Wells by Study Area, Well Type, Associated Operation and Description

Study Area(s)	Well ID	Well Type	Management Unit (MU)	Operation/ Program[1]	Setting	Location Description and Rationale
Background	FR_HMW5	Monitoring	1	FRO	Tributary valley bottom	Background well upgradient of FRO in Henretta Creek drainage. Selected to provide background regional groundwater conditions. Note that the suitability of this well as a reference well based on groundwater quality results is under investigation.
	GH_GA-MW-1	Monitoring	3	GHO	Elk River valley bottom	Selected to monitor groundwater conditions in Elk River valley bottom near GHO upgradient of Study Area 4. Note that the suitability of this well as a reference well is under investigation.
1	FR_09-01-A	Monitoring	1	FRO	Fording River valley bottom	Downgradient of South Kilmarnock Phase 1 and 2 Settling Ponds, Swift Creek and Kilmarnock Creek, upgradient of Cataract Creek and Study Area 1. Selected to monitor groundwater in the Fording River Valley near the site boundary of FRO.
	FR_09-01-B	Monitoring	1	FRO		
	FR_GH_WELL4[2]	Supply	1	FRO		Wells screened within Fording River valley-bottom sediments at the southern border of FRO (within the mine-permitted boundary), downgradient of Swift, Porter and Cataract Creeks. Selected to monitor groundwater transported outside of mine-permitted areas in Study Area 1.
2	LC_PIZDC1307	Monitoring	1	LCO	Tributary valley bottom	Multi-level overburden sentry well upgradient of Study Area 2 in the LCO Dry Creek valley bottom. Selected to monitor potential influence of planned upland and tributary valley-bottom development at LCO Phase II.
	LC_PIZDC1308	Monitoring	1	LCO		
3	GH_POTW09	Supply	1	GHO	Fording River valley bottom	Located in the Fording River Valley Aquifer. Selected to monitor groundwater conditions in Study Area 3.
	GH_POTW10	Supply	1	GHO		
	GH_POTW15	Supply	1	GHO		
	GH_POTW17	Supply	1	GHO		
4	GH_MW-ERSC-1	Monitoring	3	GHO	Elk River valley bottom	Located near the southern boundary of Study Area 4. Selected as a potential sentry well to monitor groundwater quality in Elk River valley-bottom sediment.
	GH_GA-MW-2	Monitoring	3	GHO		Downgradient of Wolfram Creek Settling Ponds. Selected to monitor upland and tributary valley-bottom influences from the west side of GHO and evolution of groundwater quality within the Elk River valley bottom in Study Area 4.
	GH_GA-MW-3	Monitoring	3	GHO		Downgradient of Thompson Creek Settling Ponds. Selected to monitor upland and tributary valley-bottom influences from the west side of GHO and evolution of groundwater quality within the Elk River valley bottom in Study Area 4.
	GH_GA-MW-4	Monitoring	3	GHO		Downgradient of Leask Creek Settling Ponds. Selected to monitor upland and tributary valley-bottom influences from the west side of GHO and evolution of groundwater quality within the Elk River valley bottom in Study Area 4.
	RG_DW-01-03	Supply	3	RDW		5 km downgradient of Study Area 4. Selected as a potential sentry well to monitor groundwater within Elk River valley bottom sediment downgradient of Study Area 4.
	RG_DW-01-07	Domestic	3	RDW		15 km downgradient of Study Area 4. Selected as a sentry well to monitor groundwater within the Elk River valley bottom downgradient of Study Area 4.
5/6	LC_PIZP1101	Monitoring	4	LCO	Elk River valley bottom	Southwest of the effluent ponds at the LCO Process Plant Site, upgradient of Study Area 6. Selected to monitor potential influence from the LCO Process Plant Site on the Elk River valley bottom in Study Area 6.
7	EV_GV3gw	Monitoring	4	EVO	Tributary valley bottom	Nearest upgradient well of Study Area 7, within the Grave Creek valley bottom. Selected to monitor upland and tributary valley-bottom input from drainages to the northeast of EVO.
	RG_DW-02-20	Domestic	4	RDW	Elk River valley bottom	4 km downgradient of Study Area 6. Selected to monitor groundwater in the Elk River valley bottom in Study Area 7.
8	EV_LSgw	Monitoring	4	EVO	Elk River valley bottom	Located near the discharge of Lindsay Creek to the Elk River. Selected to monitor potential inputs to Study Area 8 from upland, tributary valley bottom, and Elk River valley-bottom features along the western slope of EVO.
	EV_OCgw	Monitoring	4	EVO		Immediately downgradient of Lagoon D and adjacent to Otto Creek. Selected to monitor potential inputs to Study Area 8 from upland, tributary valley bottom, and Elk River valley-bottom features along the western slope of EVO.

Table C (Cont'd): Groundwater Monitoring Wells by Study Area, Well Type, Associated Operation and Description

Study Area	Well ID	Well Type	Management Unit (MU)	Operation/ Program[1]	Setting	Location Description and Rationale
9	EV_BCgw	Monitoring	4	EVO	Michel Creek valley bottom	Downgradient of the confluence of Bodie Creek and Michel Creek. Selected to monitor spatial distribution of water quality within Michel Creek valley-bottom sediment in relation to potential inputs in Study Area 9.
	EV_MCgwS	Monitoring	4	EVO	Michel Creek valley bottom	1.8 km upgradient of the confluence of Michel Creek and the Elk River. Selected to monitor spatial distribution of water quality within Michel Creek valley-bottom sediments in relation to potential inputs in Study Area 9.
	EV_MCgwD	Monitoring	4	EVO		
	EV_BRgw	Supply	4	EVO		Michel Creek valley bottom upgradient and downgradient of Gate Creek and Bodie Creek confluence with Michel Creek. Selected to monitor spatial variation in groundwater quality within Michel Creek valley bottom in relation to Study Area 9.
	EV_RCgw	Supply	4	EVO		
	EV_WH50gw	Supply	4	EVO		
	RG_DW-03-01	Domestic	4	RDW		1.2 km upgradient of the confluence of Michel Creek and the Elk River. Selected as a potential sentry well to monitor groundwater within Elk River valley-bottom sediment downgradient from Study Area 9.
10	EV_ECgw	Monitoring	4	EVO	Tributary valley bottom	Nearest upgradient well of Study Area 10, within Erickson Creek valley bottom. Selected as a sentry well to monitor potential influence of upland and tributary valley-bottom groundwater from the southwest portion of EVO to Study Area 10.
11	CM_MW1-OB	Monitoring	4	CMO	Michel Creek valley bottom	Multi-level sentry well immediately downgradient of CMO and the confluence of Michel Creek and Corbin Creek. Selected to monitor groundwater in the Michel Creek valley bottom in Study Area 11.
	CM_MW1-SH	Monitoring	4	CMO		
	CM_MW1-DP	Monitoring	4	CMO		
12	EV_ER1gwS	Monitoring	4	EVO	Elk River valley bottom	Adjacent to the Elk River, 1 km downgradient of the confluence with Michel Creek. Selected as a multi-level sentry well to monitor groundwater in Elk River valley-bottom sediment in Study Area 12.
	EV_ER1gwD	Monitoring	4	EVO		
	RG_DW-03-04	Supply	4	RDW		Near the border of MU 4 and MU 5 in the Elk River valley bottom. Selected as a sentry well to monitor deep overburden groundwater in the Elk River valley bottom at the southern extent of Study Area 12.

[1] Operation/Program refers to the Operation (i.e., FRO, GHO, LCO, EVO, CMO) and/or Program (i.e., SSGMP and RDW) that is responsible for carrying out the monitoring related to each Study Area.
[2] Prior to Q4 2017 greenhouse water supply wells, which include four wells (FR_GH_WELL1, FR_GH_WELL2, FR_GH_WELL3 and FR_GH_WELL4), were variably sampled. Beginning in Q4 2017, only FR_GH_WELL4 is sampled.

2.2.1 Supplemental Groundwater Monitoring Locations

Since the 2015 RGMP, a number of groundwater monitoring locations have been identified as providing value in the understanding in select Study Areas. Some of these were described and added to the 2017 RGMP Update (SNC-Lavalin, 2017a), and others are locations that were identified afterwards. A comprehensive review of suitable groundwater monitoring locations for the RGMP will be performed for the planned 2020 RGMP Update; however, some data and discussion of these locations have been presented in the 2018 RGMP Annual Report. These monitoring wells are presented in Table D.

Table D: Supplemental Groundwater Monitoring Wells by Study Area, Well Type, Associated Operation and Description

Study Area	Well ID	Well Type	MU	Operation	Setting	Location Description and Rationale
Background	CM_MW3-SH	Monitoring	4	CMO	Tributary valley bottom	Background well upgradient of CMO in Michel Creek Valley.
	CM_MW3-DP	Monitoring	4	CMO	Tributary valley bottom	
1	GH_MW-PC	Monitoring	1	GHO	Fording River valley bottom	Along Porter Creek drainage.
3	GH_MW-RLP-1D	Monitoring	1	GHO	Fording River valley bottom	In the Fording River Valley Aquifer. Selected to monitor groundwater conditions in Study Area 3.
9	EV_HW1[1]	Supply	4	EVO	Michel Creek valley bottom	Michel Creek valley bottom upgradient and downgradient of Gate Creek and Bodie Creek confluence with Michel Creek. Selected to monitor spatial variation in groundwater quality within Michel Creek valley bottom in relation to Study Area 9.

[1] EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.
[2] MU denotes Management Unit.

2.3 Summary of SSGMP 2018 Annual Reports

A summary of site-specific groundwater reports was developed to fulfill requirements listed in Section 10.4 of Permit 107517 which states, "*The Annual Report must include summaries of the site specific groundwater reports".* The 2018 Annual Reports for each site-specific program were prepared for Teck and presented in the following references:

- FRO: SNC-Lavalin (2019a);
- GHO: SNC-Lavalin (2019b);
- LCO: Golder (2019a);
- EVO: SNC-Lavalin (2019c); and
- CMO: SRK (2019).

SNC-Lavalin reviewed the 2018 SSGMPs for each operation as part of the 2018 RGMP. A summary of the results and recommendations from each operation is provided in Appendix II along with site location plans showing well locations, tables providing field and analytical results, plan view maps indicating 2018 results for CI, and a QA/QC summary of analytical data presented in the SSGMPs and relevant to the RGMP.

3 Regulatory Framework

Groundwater quality data is screened against a number of different criteria based on applicable receptors. A technically-based screening process was developed for the 2015 RGMP and was updated in the 2017 RGMP Update. Primary and secondary screening criteria may be adjusted based on the needs and requirements for other programs under the AMP. For example, Teck's monitoring programs have indicated potential effects attributable to nickel at concentrations in surface water lower than the *British Columbia Approved Water Quality Guidelines* (BCWQG, BC ENV, 2018). Teck is currently evaluating appropriate screening values for nickel to be more protective of aquatic health and is currently working with regulators to determine how the nickel BCWQG will be adjusted. If a new BCWQG is established for surface water, adjustments will be made to the screening levels in the RGMP in order to be consistent.

3.1 Primary Screening Criteria

The primary screening approach is consistent with regulatory guidance, including: Technical Guidance (TG) Document 6: *Assessment of Hydraulic Properties for Water Use Determination* (BC ENV, 2015) for *Environmental Management Act* (EMA) Applications; and TG Document 15: *Concentration Limits for the Protection of Aquatic Receiving Environments* (BC ENV, 2017). The primary screening process considers the following receptors:

- **Human Health** – groundwater used for drinking water for current and future use as a default use, consistent with TG 6. Primary screening of groundwater data for protection of drinking water (DW) is conducted against the applicable *Contaminated Sites Regulation* (CSR; BC ENV, 2019) DW.
- **Freshwater Aquatic Life** – groundwater discharging to aquatic environments as a default use, consistent with TG 6. Primary screening of groundwater data for protection of aquatic life is completed against CSR aquatic life (AW) standards. Consistent with TG 15, and as a conservative approach, the application of *British Columbia Approved Water Quality Guidelines* (BCWQG; BC ENV, 2018) to wells within 10 m of the high-water mark is applied.
- **Irrigation and Livestock Watering** – groundwater for livestock or irrigation watering use. This use is not described in TG 6; however, these uses are applied to be conservative as livestock and irrigation water supplies are sourced from groundwater wells in some locations. Because the EMC have indicated that livestock watering use was used as a surrogate for wildlife watering, livestock watering should be applied as a default use. Primary screening of groundwater data protection of irrigation and livestock watering is completed against CSR Irrigation (IW) and Livestock (LW) standards.

This screening process allows for comparison of water to uniform criteria for groundwater protection across the Elk Valley using the CSR standards as well as the Approved and Working BCWQG, as applicable. The default uses, which consist of human health, freshwater aquatic life, and livestock as a surrogate for wildlife are applied across the entire valley.

Table 1, attached, summarizes the primary screening criteria for the RGMP wells. SNC-Lavalin reviewed the wells located within ten metres of a high-water mark, consistent with TG 15 described above, and found that EV_OCgw is within 10 metres of a high-water mark. Results from EV_OCgw were therefore compared to BCWQG for AW. Previously, GH_POTW17, EV_BCgw and EV_MCgwS/D were also compared to BCWQG for AW instead of CSR; however, review of these well locations with the updated surface water feature layer provided by Teck in 2017 indicated these wells are greater than 10 metres (m) from the high-water mark and results were compared to CSR AW standards.

3.2 Secondary Screening

The primary screening step provides the main indicator for groundwater quality; however, recharge of groundwater from surface water elevated in CI (i.e., the surface water pathway; SNC-Lavalin, 2017a) means that groundwater may be higher than BCWQG and CSR standards. As a result, a secondary screening step for aquatic life is specified to provide a comparison to area-based surface water quality requirements listed in Permit 107517. Surface water quality is collected at monitoring locations specified by the Ministerial Order (referred to as Order Stations). The secondary screening criteria provides context for Teck's operational surface water quality requirements, as well as a technical-based framework for regional evaluation of groundwater to protect aquatic life in the Elk Valley (i.e., the area-based Site Performance Objective [SPO] and Compliance Point [CP] concentrations specified in Permit 107517).

Selenium is the only constituent with CP and SPO concentration values greater than primary screening criteria (i.e., BCWQG or CSR standards), and therefore is the only constituent where secondary screening will be of value. Geographically relevant CP and SPO concentration values are specified for the secondary screening process for selenium. CP and SPO criteria in the main stem rivers differ along the flowpath, and therefore screening of groundwater data against these criteria were applied accordingly (i.e., criteria were applied to groundwater wells inferred to be up-gradient of the nearest downstream surface water CP or Order Station).

As a secondary screening step for drinking water use, groundwater concentrations for selenium were screened against the *Guidelines for Canadian Drinking Water Quality* (GCDWQ; Health Canada, 2017) to provide context in relation to recent toxicological studies. The GCDWQ for selenium was updated in October 2014 from 10 µg/L to 50 µg/L and is similar to the value developed in the Human Health Risk Assessment (Ramboll Environ., 2016). Secondary screening for selenium was completed only where sample concentrations exceeded primary screening criteria for drinking water.

As a secondary screening step for drinking water use, groundwater concentrations for selenium were screened against the GCDWQ (Health Canada, 2017) to provide context in relation to recent toxicological studies. The GCDWQ for selenium was updated in October 2014 from 10 to 50 µg/L and is similar to the value developed in the Human Health Risk Assessment (Ramboll Environ., 2016). Secondary screening for selenium was completed only where sample concentrations exceeded primary screening criteria.

The CP and SPO selenium criteria applied in each are shown below in Table E.

Table E: Secondary Groundwater Screening Criteria

Study Area(s)	Site Performance Objective		Compliance Point	
	Surface Water Station (EMS ID[1])	Selenium[2] (µg/L)	Surface Water Station (EMS ID)	Selenium (µg/L)
Background	GH_FR1 (0200378)[3]	63	FR_FRCP1 (E300071)[3]	130
	EV_ER1 (0200393)[4]	19	CM_MC2 (E258937)[4]	19
	GH_ER1 (E206661)[5]	19	GH_ERC (E300090)[5]	15
1	GH_FR1 (0200378)	63	FR_FRCP1 (E300071)	130
2, 3	GH_FR1 (0200378)	63	GH_FR1 (0200378)	80
4	GH_ER1 (E206661)	19	GH_ERC (E300090)[6]	15
6	EV_ER4 (0200027)	23	-	-
7, 8, 12	EV_ER1 (0200393)	19	-	-
9, 10	EV_ER1 (0200393)	19	EV_MC2 (E300091)[6]	28
11	EV_ER1 (0200393)	19	CM_MC2 (E258937)	19

[1] Environmental Monitoring System.
[2] SPO is effective December 31, 2019.
[3] EMS station associated with FR_HMW5.
[4] EMS station associated with CM_MW3-SH and CM_MW3-DP.
[5] EMS station associated with GH_GA-MW-1.
[6] Where applicable.

4 2018 Results and Discussion

Results are presented by Study Area, as defined in Section 1. Drawings with well locations and tables summarizing results above screening criteria are referenced throughout the text below. Laboratory analytical reports for monitoring wells only included in the 2018 RGMP Annual Report are presented in Appendix V. Laboratory analytical reports for monitoring wells that are included in both the 2018 RGMP Annual Report and the 2018 SSGMP have been included in the 2018 SSGMPs (Golder, 2019a; SRK, 2019; SNC-Lavalin, 2019a, b, c). Graphs showing temporal trends, including select surface water data, are also referenced and provided in Appendix VI. Surficial and bedrock geology is presented on Drawings 661460-302 to 305. To fulfill permit requirement (ii) listed in Section 1, cross-sections showing well installation, stratigraphy, and groundwater elevations are presented on Drawings 661460-312 to 326. These drawings focus on Study Areas where the distribution of monitoring wells allows for representative cross-sections perpendicular and parallel to groundwater flow in the valley bottom. Cross-sections provided were also included in the 2017 RGMP Update and have been updated based on Q4 2018 groundwater elevation calculations. In addition, select cross-sections have been updated based on information from select newly installed monitoring wells that were available at the time of reporting. The cross-section location lines are shown on Drawings 661460-308 to 661460-311.

Monitoring well completion details for wells included in the 2018 RGMP Annual Report are presented in Table 2. Groundwater elevations from each Study Area were reviewed and assessed for seasonal variability, vertical groundwater flow, and long-term trends (Table 3). Groundwater elevations were plotted on time-series graphs and included in Appendix VI. The Q4 groundwater elevations measured at each well prior to sampling are shown on Drawings 661460-306 and 307 to provide regional context. These Drawings also show the conceptual groundwater flowpath through valley-bottom aquifers. Analytical results were compared to screening criteria are presented in Tables 4 and 5 (primary screening) and Table 6 (secondary screening). Secondary screening was completed where sample concentrations exceeded primary screening criteria for selenium. Drawings 661460-327 to 661460-342 show the spatial distribution of groundwater quality results for CI (selenium, nitrate-nitrogen, sulphate, and dissolved cadmium) by constituent in each Study Area.

For additional reference and to assist with visualization, the 3D block diagrams have been included in Appendix VII and have been updated with minimum and maximum concentrations of CI measured in 2018.

4.1 Modifications to the RGMP

Groundwater levels were monitored, and groundwater samples collected at each location included in the RGMP for each quarter, as follows:

- Winter (First Quarter – Q1): January, February, March;
- Spring (Second Quarter – Q2): April, May, June;
- Summer (Third Quarter – Q3): July, August, September; and
- Fall (Fourth Quarter – Q4): October, November, December.

Exceptions to the 2018 RGMP Annual Report are noted below in Table F.

Table F: Summary of Program Modifications

Study Area(s)	Well ID	Q	Modification	Explanation
Background	FR_HMW5	1	Well not sampled	Water frozen in well
1	FR-09-01-A	1	Well not sampled.	Dry well
2	LC_PIZDC1307	1	Total Kjeldahl nitrogen (TKN) and total organic carbon (TOC) not collected	Sample was not submitted for analysis of these parameters
2	LC_PIZDC1308 (and duplicate)	1	TKN, TOC not collected	Sample was not submitted for analysis of these parameters
4	RG_DW-01-03	3	Field measured dissolved oxygen (DO)	Not recorded in the field
5/6	LC_PIZP1101	3	pH, conductivity, total suspended solids (TSS), total dissolved solids (TDS), turbidity, total alkalinity, ammonia nitrogen, bromide, chloride, fluoride, nitrate, nitrite, ortho-phosphate, total phosphorus, and sulphate not collected	Sample was not submitted for analysis of these parameters due to constraints in the field during the sampling event
9	EV_BRgw EV_RCgw EV_WH50gw	2	Total phosphorus (as P) not collected	Parameter was not measured by the laboratory

4.2 Background (Reference) Conditions

Background well FR_HMW5 is monitored to understand reference conditions in the valley bottom of Henretta Creek, located upgradient of the permitted mine boundary at FRO. Monitoring well FR_HMW5 is completed in alluvial sediment in the Henretta Creek valley bottom, a tributary in the upper watershed of the Fording River. This monitoring well is currently under review to assess its suitability as a reference well.

Other background wells exist but were not listed in the 2015 RGMP. These have been included for discussion purposes below.

- Well GH_GA-MW-1 is monitored to understand reference conditions in the valley bottom near No Name Creek, upgradient of the permitted mine boundary at GHO, along the Elk River Valley. The well is completed in low permeability till and lacustrine/glaciolacustrine sediment. Because of its low permeability, this monitoring well does not appear to be suitable to monitor reference conditions.
- Nested monitoring wells (CM_MW3-SH/DP) were installed upgradient of CMO in the Michel Creek valley to assess groundwater quality in the overburden and shallow bedrock. It is upstream of mining activities and representative of background groundwater conditions in this area. These wells were identified in the 2017 RGMP Update (SNC-Lavalin, 2017a) as being suitable to monitor reference conditions.

The background monitoring well network was recently discussed in the April 2018 GWG meeting and it was recognized that a greater understanding of reference monitoring conditions in the Elk Valley is required. A review of suitable locations for background monitoring wells is planned in consultation with the GWG. It is noted that a number of new monitoring wells have been installed in the northern portions of Study Area 4 (i.e., upgradient of GHO) which may be suitable for understanding reference conditions in the Elk River valley bottom; these wells will be considered as part of the review. The newly installed monitoring wells that may be considered are as follows and presented on Drawing 661460-308:

- three nested wells (GH_MW-Willow-1S/D, GH_MW-Willow-2S/D, and GH_MW-Willow-3S/D) near Willow Creek were drilled as part of the Cougar Pit Extension Project; and
- two nested wells (GH_MW-Wolf-1S/D and GH_MW-Wolf-2S/D) near Wolf Creek were drilled as part of the Cougar Pit Extension Project.

4.2.1 Groundwater Levels

Continuous measurements generally display higher groundwater elevations in FR_HMW5 during freshet. The 2018 data display a rising groundwater elevation at the end of April, peak elevations in mid-May, and a steady decline to mid-July, consistent with historical trends (Table 3). The maximum fluctuation of groundwater elevation in 2018 was approximately 0.36 m. Between January 2015 and December 2018, the groundwater elevation ranged from 1,784.23 metres above sea level (masl) to 1,785.48 masl (Appendix VI: Graph B-1).

Groundwater elevations in GH_GA-MW-1 showed a time lag of approximately 30 days for groundwater levels to return to static levels after a sampling event. This is consistent with the low hydraulic conductivity value (1×10^{-12} m/s) reported in previous studies. Groundwater elevations at GH_GA-MW-1 were relatively consistent throughout the year and did not vary seasonally.

On average, groundwater elevations at deep well CM_MW3-DP were 0.34 m deeper than at the shallow well pair CM_MW3-SH in 2018, consistent with historical measurements (Table 3). Groundwater elevations were greatest in both wells in Q2 during freshet and water levels were slightly higher than surface water levels in the adjacent Michel Creek (SRK, 2019). Vertical groundwater flow is inferred to be upwards from bedrock to the shallow gravel aquifer with calculated vertical hydraulic gradients ranging from 0.030 m/m to 0.044 m/m (Table 3). SNC-Lavalin understands that prior to Q4 2018, water levels at CMO have historically been measured from top of steel casing (inferred to be the top of PVC casing elevation previously reported). Teck intends on measuring water level from top of PVC pipe casing during future monitoring events and is planning on re-surveying the wells based on top of PVC pipe casing in 2019.

4.2.2 Groundwater Quality

Field parameters for FR_HMW5, GH_GA-MW-1, CM_MW3-SH, and CM_MW3-DP measured in 2018 were similar to historical results. A summary of CI and non-order constituents above primary screening criteria for the wells is presented in Table G and Table H.

Table G: Summary of Constituents above Primary Screening Criteria in Background Wells (1/2)

Constituent[1,2,3]	FR_HMW5				GH_GA-MW-1			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Chloride	-	-	-	-	-	-	-	-
Boron	-	-	-	-	IW			
Copper	-	-	-	-	AW	AW, IW	-	AW
Lithium	NS[4]	DW	DW	DW	DW			
Manganese	-	-	-	-	IW			
Strontium	-	-	-	-	DW			

Notes:
[1] Dissolved parameter unless otherwise indicated.
[2] Primary screening criteria applied are CSR standards for Aquatic Life (AW), Drinking Water (DW), Livestock (LW) and Irrigation (IW).
[3] '–' denotes result below primary screening criteria for given constituents.
[4] 'NS' denotes no sample; well could not be sampled because it was frozen.

Table H: Summary of Constituents above Primary Screening Criteria in Background Wells (2/2)

Constituent[1,2,3]	CM_MW3-SH				CM_MW3-DP			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Chloride	-	-	-	-	DW, LW, IW			
Boron	-	-	-	-	IW	-	-	-
Lithium	DW	-	DW	DW	DW			
Sodium	-	-	-	-	DW			

Notes:
[1] Dissolved parameter unless otherwise indicated.
[2] Primary screening criteria applied are CSR standards for Aquatic Life (AW), Drinking Water (DW), Livestock (LW) and Irrigation (IW).
[3] '–' denotes result below primary screening criteria for given constituents.

CI were not measured above primary screening criteria in the background wells in 2018. Concentrations of dissolved boron, manganese, chloride, sodium, and strontium above the primary screening criteria have been measured in at least one event in background wells. As indicated in the 2017 RGMP Update, concentrations of these constituent are considered to be naturally occurring and derived from interaction with bedrock. They not considered a concern. We note that a list of non-order constituents was developed for surface water early warning triggers (Azimuth, 2018) as part of the AMP. This list will be reviewed in conjunction with the groundwater quality data set as part of the groundwater trigger development under the AMP to confirm the list of non-order constituents for groundwater.

Lithium concentrations measured at FR_HMW5 in 2018 (160 to 177 µg/L) were lower than concentrations measured in 2017, but were the highest concentrations measured in the Henretta Creek and Fording River valleys by one to two orders of magnitude. Dissolved lithium concentrations in the nested well pair ranged from 7.4 to 11.6 µg/L at shallow well CM_MW3-SH and 1,120 to 1,290 µg/L at deep well CM_MW3-DP. A review of dissolved lithium concentrations in the Elk Valley between 2015 and 2017 indicated that concentrations were greater than the CSR DW standard in 93% of the wells in at least one quarter (SNC-Lavalin, 2018a). Dissolved lithium concentrations measured at CM_MW3-DP were the second highest in the Elk Valley (SNC-Lavalin, 2018d). These results indicate that lithium concentrations are naturally high across the Elk Valley and derived from bedrock.

Dissolved copper exceeded the CSR AW and DW standard at GH_GA-MW-1 in Q1, Q2, and Q4. Teck indicated that copper fittings were installed in the well, which may be the source of dissolved copper. The fittings are scheduled to be removed and replaced in 2019.

4.2.3 Discussion

Groundwater quality results for Cl for reference wells FR_HMW5, GH_GA-MW-1, CM_MW3-SH, and CM_MW3-DP were below the primary screening criteria for each quarter in 2018 with no clear seasonal trend, except at FR_HMW5.

As indicated in the FRO 2018 SSGMP (SNC-Lavalin, 2019a), an increase in detectable concentrations of dissolved selenium and sulphate at FR_HMW5 has been noted. Review of available analytical data from FR_HMW5 indicate that between 2015 and 2018, seven of the thirteen sampling events detected dissolved selenium above the detection limit beginning in May 2016 (excluding one anomalous result; SNC-Lavalin, 2016, 2017b, 2018a). Excluding the anomalous result, dissolved selenium concentrations measured in Q3 (2.27 µg/L) 2018 were the second highest measured since November 2012. Sulphate concentrations reached historical highs in Q3 of 2018 (Figure 4). These results support previous interpretations that FR_HMW5 may be influenced by mine-influenced water from the adjacent spoils and may no longer be suitable as a reference well (SNC-Lavalin, 2019). This would also suggest that groundwater in FR_HMW5 and groundwater on the north side of Henretta Creek are hydraulically connected and underflow of the creek may be occurring. Notably, Q3 dissolved selenium concentrations at adjacent Henretta Creek surface water station FR_HC3, where a hydraulic connection to FR_HMW5 has previously been inferred, were relatively lower than groundwater in FR_HMW-5 as shown on Graph B-2 in Appendix VI.

Nitrate-nitrogen and dissolved cadmium at FR_HMW5, GH_GA-MW-1, CM_MW3-SH, and CM-MW3-DP were below or of the same magnitude as the method detection limit (MDL) in each quarter. Sulphate concentrations were greatest in reference well FR_HMW5 ranging from 48.7 mg/L to 51.3 mg/L in 2018 (Appendix VI, Graph B-3). These concentrations were on average one to two orders of magnitude less than sulphate concentrations measured at the majority of the monitoring wells included in the RGMP in 2018.

4.3 Study Area 1: Fording River Valley Bottom Downgradient of Fording River Operations, Cataract and Porter Creeks

This area was identified because it is the focal point for the majority of upland and tributary valley groundwater flow to the Fording River valley bottom near the FRO and GHO mine permitted boundaries and the primary off-site migration pathway from FRO (Drawing 661460-308). Study Area 1 is downgradient of the South Tailings Pond (STP), South Kilmarnock Settling Ponds, Kilmarnock Creek, Swift Creek, Cataract Creek and Porter Creek watersheds. Wells installed in overburden (upland and valley-bottom sediment) and relevant surface water locations for Study Area 1 are shown on Drawing 661460-308.

Glaciofluvial and fluvial deposits consisting of medium- to coarse-grained unconsolidated sediment are in the Fording River floodplain south of the STP and in the vicinity of the Kilmarnock Settling Ponds and considered the key aquifer for Study Area 1 (Appendix VII). The aquifer is unconfined with a saturated thickness ranging from ~ 5 m, immediately south of the STP, to > 30 m farther downgradient.

Two monitoring well locations are included for Study Area 1: FR_09-01-A/B (nested) and FR_GH_WELL4, which is one of four greenhouse water supply wells that was recommended in a hydrogeological assessment as the dedicated well for sampling. FR_09-01-A/B and FR_GHHW were selected to monitor valley-bottom groundwater near the southern site boundary of FRO (SNC-Lavalin, 2017c).

In 2016, monitoring well GH_MW-PC was installed as part of the GHO SSGMP (Hemmera, 2017). The well was installed in shallow overburden to assess groundwater quality in the vicinity of Porter Creek. Monitoring well GH_MW-PC was included in the 2017 RGMP Update (SNC-Lavalin, 2017a) and has been added for discussion purposes. In addition, several monitoring wells installed as part of recent (i.e., late 2018) studies for the FRO SSGMP FRO Castle and FRO AWTF-S projects have been included on plan view map Drawing 661460-308 and C-C' cross-section (Drawing 661460-314) for discussion and visualization purposes; it is noted that groundwater quality at these locations was not available at the time of reporting. The following wells were added.

- Two wells (FR_MW-SK1A/B) were drilled as part of the SSGMP;
- Five wells (FR_MW_FRRD1, FR_MW_CASW6-A/B, FR_MW-CH1-A/B) were drilled as part of the Castle Mountain Project; and
- Four wells (FR_KB-1A, FR_KB-2A, FR_KB-3A/B) were drilled as part of the Active Water Treatment Facility South (AWTF-S).

4.3.1 Groundwater Levels

Groundwater elevations in FR_09-01-A/B and GH_MW-PC from May 2015 to December 2018 were plotted on a time-series graph and included in Appendix VI (Graph 1-1). Due to limited access to the wellhead at FR_GH_WELL4, groundwater levels were not recorded.

Groundwater elevations at FR_09-01-A/B wells followed a seasonal trend with higher groundwater elevations recorded in June. Water levels at FR_09-01-A/B varied by up to approximately 6.9 m between June and November 2017. Between May 2015 and December 2018, groundwater elevations ranged from 1,577.31 to 1,583.79 masl (FR_09-01-A) and 1,575.77 to 1,583.26 masl (FR_09-01-B). Based on groundwater elevations recorded at FR_09-01-A/B, the vertical groundwater flow is inferred to be downward from the shallow sandy gravel unit towards the deeper gravel unit (Table 3). The calculated vertical hydraulic gradient at FR_09-01-A/B varied from -0.052 to -0.066 m/m in 2018 (Table 3).

Groundwater elevations at GH_MW-PC have been relatively consistent since the well was installed in 2016, fluctuating by 0.6 m between November 2016 and December 2018. Groundwater elevations have historically been highest in Q1 and Q2.

4.3.2 Groundwater Quality

A summary of results above primary screening criteria for Study Area 1 is presented in Table I.

Table I: Summary of Constituents above Primary Screening Criteria for Study Area 1

Constituent[1,2,3]	FR_09-01-A				FR_09-01-B				FR_GH_WELL4[5]				GH_MW-PC			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Nitrate	NS[4]	DW	DW	DW	DW				-	-	-	-	-	-	-	-
Selenium	NS	AW, DW, LW, IW			AW, DW, LW, IW				AW, DW, LW, IW				AW, DW, LW, IW			
Chromium	NS	-	-	-	-	-	-	-	-	-	-	-	-	IW	-	-
Copper	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	AW IW LW	AW
Lithium	NS	-	DW	DW	DW				DW				-	DW	DW	-

Notes:
1 Dissolved parameter unless otherwise indicated.
2 Primary screening criteria applied are CSR standards for Aquatic Life (AW), Drinking Water (DW), Livestock (LW) and Irrigation (IW).
3 '–' denotes result below primary screening criteria for given constituents.
4 'NS' denotes no sample; well could not be sampled because it was frozen.
5 As a recommendation of the hydrogeological assessment (SNC-Lavalin, 2017c), monitoring of a dedicated well (FR_GH_WELL4) began in Q4 2017.

The only other constituents, other than CI, that were greater than the primary screening criteria were dissolved chromium and copper at GH_MW-PC and lithium at each of the four wells. Concentrations of dissolved chromium and copper were interpreted to be locally sourced as concentrations were less than the primary criteria in the majority of the wells across the Elk Valley. Dissolved lithium concentrations are inferred to originate from natural sources.

Table J shows the summary of results above secondary screening criteria. Most samples were above secondary SPO and DW criteria.

Table J: Summary of Constituents above Secondary Screening Criteria in Study Area 1

Constituent[1,2,3]	FR_09-01-A				FR_09-01-B				FR_GH_WELL4[5]				GH_MW-PC			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Selenium	NS[4]	DW, SPO	DW, SPO	-	DW	DW, SPO	DW, SPO	-	DW, SPO				DW	DW, SPO	DW, SPO	DW, SPO

Notes:
1 Dissolved parameter unless otherwise indicated.
2 Secondary screening criteria are Site Performance Objective (SPO), Compliance Point (CP) and GCDWQ for drinking water (DW)
3 '–' denotes result below primary screening criteria for given constituents.
4 'NS' denotes no sample; well could not be sampled because it was frozen.
5 As a recommendation of the hydrogeological assessment (SNC-Lavalin, 2017c), monitoring of a dedicated well (FR_GH_WELL4) began in Q4 2017.

4.3.3 Discussion

Discussion of trends in groundwater quality in Study Area 1 focuses on dissolved selenium and nitrate-nitrogen, which were the CI above screening criteria. Time-series plots of dissolved selenium and nitrate-nitrogen from the selected wells located in Study Area 1 are shown in Appendix VI (Graphs 1-2(1), 1-2(2), 1-3(1) and 1-3(2)). For comparison purposes, surface water concentrations measured in Fording River at surface water station FR_FR2, FR_FR4, and in Kilmarnock Creek at surface water station FR_KC1

were added to Graphs 1-2(1) and 1-3(1). As indicated in the FRO SSGMP (SNC-Lavalin, 2019a), mine-influenced groundwater is inferred to result from infiltration of surface water over the Kilmarnock alluvial fan and tributary valley-bottom flow. The Kilmarnock Creek drainage is considered a major source of mining-related constituents to Fording River valley-bottom groundwater in the area. Groundwater is known to flow down-valley into Study Area 1, and the mine-influenced groundwater is represented by FR_09-01-A/B and farther downgradient in monitoring well FR_GH_WELL4. The mine-influenced Fording River does not appear to significantly affect groundwater chemistry at these monitoring locations as concentrations of Cl are relatively lower (Appendix VI, Graphs 1-2(1) and 1-3(1)).

Dissolved selenium and nitrate-nitrogen concentrations were overall lower at FR_09-01-A/B than at FR_GH_WELL4 and less than concentrations measured in surface water at upstream location FR_KC1 (with the exception of one sample from June 2016) in Kilmarnock Creek. Concentrations of Cl have historically been greater at FR_09-01A and FR_GH_WELL4 than concentrations measured in the Fording River surface water monitoring station FR_FR4 (Graphs 1-2(1) and 1-3(1)) and other wells located closer to Fording River (e.g., FR_09-02-A/B) monitored as part of the FRO SSGMP (SNC-Lavalin, 2019a). Concentrations of Cl at FR_09-01B have been greater than FR_FR4 since 2016. This suggests the presence of a preferential groundwater flowpath on the east side of the Fording River valley from Kilmarnock Creek drainage to FR_GH_WELL4.

The gap identified for Study Area 1 was that the extent of the valley-bottom aquifer and the mine-influenced groundwater is not defined. The newly-installed wells FR_MW-SK1A/B, FR_MW_FRRD1, FR_MW_CASW6-A/B, and FR_MW-CH1-A/B (Drawing 661460-308) installed in the eastern portion of the Fording River valley bottom should provide greater detail on the extent of the aquifer and the mine influence in Study Area 1 downgradient of FRO. In addition, the new wells FR_KB-1A, FR_KB-2A, FR_KB-3A/B (Drawing 661460-308) installed in the Kilmarnock will greatly improve the understanding of the aquifer and sources of the groundwater mine-influence upgradient of Study Area 1 (Drawings 661460-313 and 661460-314).

Farthest downgradient in monitoring well GH_MW-PC, dissolved selenium concentrations were similar to those measured upgradient in the Fording River Valley at FR_GH_WELL4; however, there was no discernible trend since sampling began in 2016. Nitrate concentrations at GH_MW-PC were an order of magnitude less than upgradient wells in the Fording River valley, whereas the highest sulphate concentrations in Study Area 1 were measured at GH_MW-PC in 2018. The GHO SSGMP (SNC-Lavalin, 2019b) indicated that Porter Creek is main transport pathway for loading of mine-influenced constituents to groundwater in the valley-bottom drainage, which is supported by comparison of chemistry to GH_PC1 (Appendix VI, Graph 1-2(2) and 1-3(2)). Low concentrations of nitrate coupled with elevated concentrations of sulphate at GH_MW-PC, relative to concentrations in wells upgradient in the Fording River Valley, may be indicative of preferential attenuation of nitrate in groundwater in this area of Study Area 1.

4.4 Study Area 2: Fording River Valley Bottom Downgradient of LCO Dry Creek

Study Area 2 was selected because the LCO SSGMP identified that it receives drainage from the permitted LCO Phase II mining in the southern portion of the LCO Dry Creek watershed. The LCO Phase II mining includes an estimated 500 ha footprint of waste rock storage (Golder, 2016). The Dry Creek Water Management System (DCWMS) was constructed to divert, convey, and treat mine-influenced surface runoff, which is interacting with waste rock associated with LCO Phase II mining, from the Dry Creek watershed. The DCWMS was fully commissioned in July 2015 and intercepts mine-influenced water and

distributes it to two sediment ponds for treatment of TSS. Clarified water is returned to Dry Creek directly downstream of sediment ponds (Golder, 2016).

Although there are no groundwater wells in the Fording River valley-bottom aquifer in this area, a groundwater pathway to the valley bottom has not been identified due to the lack of a continuous aquifer. The valley bottom in the LCO Dry Creek watershed consists of a relatively thick till unit with discontinuous lenses of gravelly till (Appendix VII). The till has a relatively low hydraulic conductivity, on the order of 10^{-7} m/s to 10^{-9} m/s. Dry Creek is intermittent along some reaches and losses to groundwater are expected. Despite the lenses of gravel in the consolidated till, a continuous aquifer was not identified in the drainage. Monitoring wells LC_PIZDC1308 and LC_PIZDC1307 are shallow and deep wells installed in a colluvium/till and basal till, respectively, downstream of the DCWMS. These wells are downgradient of any potential mine influence; however, as noted in the 2017 RGMP Update (SNC-Lavalin, 2017a) the primary transport pathway to groundwater in the Fording River valley bottom is through surface water in Dry Creek, which is monitored by surface water station LC_DC3. Relevant surface water monitoring locations are also located on the Fording River for Study Area 2 (shown on Drawing 661460-308).

4.4.1 Groundwater Levels

Manual and level logger groundwater elevations measured from January 2015 to December 2018 in monitoring wells LC_PIZDC1308 (shallow) and LC_PIZDC1307 (deep) were plotted on a time-series graph and included in Appendix VI (Graph 2-1). The data indicate a seasonal trend is apparent, with annual fluctuations in 2018 of 6.1 and 1.8 m in LC_PIZDC1308 and LC_PIZDC1307, respectively (based on continuous level data). In 2018 the highest groundwater levels were measured in May and the lowest elevations were measured in March. Vertical hydraulic gradients varied from -0.030 to -0.130 m/m and groundwater flow is inferred to be downward from LC_PIZDC1308 (gravel and cobbles) to LC_PIZDC1307 (silty gravel).

4.4.2 Groundwater Quality

A summary of results above primary screening criteria for Study Area 2 is presented in Table K.

Table K: Summary of Constituents above Primary Screening Criteria for Study Area 2

Constituent[1,2,3]	LC_PIZDC1307				LC_PIZDC1308			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Barium	DW	DW	DW	DW	-	-	-	-
Lithium	DW	DW	DW	DW	DW	DW	DW	DW
Molybdenum	IW	IW	IW	IW	-	-	-	-

Notes:
1 Dissolved parameter unless otherwise indicated
2 Primary screening criteria applied are CSR standards for Aquatic Life (AW), Drinking Water (DW), Livestock (LW) and Irrigation (IW)
3 '–' denotes result below primary screening criteria for given constituents.

Groundwater quality in LC_PIZDC1308 and LC_PIZDC1307 was below the primary screening criteria concentrations for all the CI, but exceeded the primary screening criteria for other constituents. Results from 2018 were similar to previous years and consistent with findings from the 2017 RGMP Update (SNC-Lavalin, 2017a). Review of the borehole log for LC_PIZDC1307 (provided in Appendix III) indicates this well is installed in basal till, suggesting the source of barium and molybdenum likely originates from bedrock (SNC-Lavalin, 2017a). Lithium concentrations are naturally high in groundwater across the Elk Valley. Drinking or irrigation wells are not located in Study Area 2; therefore, there is no exposure pathway for these constituents.

4.4.3 Discussion

To assess groundwater and surface water interactions, selenium concentrations in groundwater were compared to concentrations in surface water in LCO Dry Creek (LC_DC1 and LC_DC3; Appendix VI, Graph 2-2). Selenium concentrations in groundwater in the drainage have been relatively low (near the detection limit) and stable since December 2014 and are lower than concentrations measured in Dry Creek. Selenium concentrations in Dry Creek surface water (LC_DC3) are two orders of magnitude higher than groundwater, having increased significantly in 2017 and again in 2018 (Appendix VI, Graph 2-2) with no concurrent increase in groundwater, supporting the interpretation that surface water is the primary pathway to the Fording River valley bottom. Fording River concentrations at station LC_FRDSDC, in Study Area 2, were higher than surface water concentrations in Dry Creek. The current contribution of CI to groundwater from infiltration of Dry Creek over the alluvial fan is interpreted to be minimal, compared to the existing load of CI in the Fording River, which has the potential to infiltrate to groundwater in the Study Area.

4.5 Study Area 3: Fording River Valley Bottom Downgradient of GHO Rail Loop and Greenhills Creek

Study Area 3 was selected because the GHO SSGMP identified potential sources (upland groundwater from GHO) as well as surface water and groundwater transport pathways that provided loading to the Fording River valley bottom. Study Area 3 is downgradient from GHO, and Greenhills Creek is the main tributary that flows into the Fording River valley bottom. Fording River valley-bottom sediment in Study Area 3 is approximately 70 m thick and consists mainly of coarse-grained glaciofluvial deposits (sand and gravel) confined by a clay/silty clay unit as shown on cross-sections D-D’ and E-E’ (Drawings 661460-315 and 661460-316) and the block diagram shown in Appendix VII.

In Study Area 3, four supply wells (GH_POTW09, GH_POTW10, GH_POTW15 and GH_POTW17) in the area near the rail loop were included in the RGMP. Since the 2015 RGMP, one monitoring well, GH_MW-RLP-1D, was installed as part of the GHO SSGMP (Hemmera, 2017). The well was installed in till to a depth of 82 metres below ground surface (mbgs) in the vicinity of the rail loop. Monitoring well GH_MW-RLP-1D was included in the 2017 RGMP Update (SNC-Lavalin, 2017a) and has been added here for discussion purposes. Selected groundwater monitoring locations and relevant surface water locations for Study Area 3 are shown on Drawing 661460-308.

4.5.1 Groundwater Levels

Groundwater levels for 2018 supply wells were not available. Seasonal variability and long-term trends in groundwater elevations in GH_MW-RLP-1D were assessed (Appendix VI, Graph 3-1). Groundwater elevations at GH_MW-RLP-1D ranged from 1,489.64 to 1,490.25 masl in 2018. Overall, groundwater elevations fluctuated by 0.8 m in 2018, with the highest water level measured in Q2, consistent with freshet and elevations measured in 2017. This well was installed in 2016 and has limited historical data; therefore, no further trends are discernible at this time.

4.5.2 Groundwater Quality

A summary of results above primary screening criteria for Study Area 3 is presented in Table L and Table M.

Table L: Summary of Constituents above Primary Screening Criteria for Study Area 3 (1/2)

Constituent[1,2,3]	GH_POTW09				GH_POTW10				GH_POTW15				GH_POTW17			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Selenium	-	-	DW, AW, IW, LW	-	-	-	-	-	-	-	-	-	-	DW	-	-
Lithium	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW
Manganese	-	-	-	-	-	-	-	-	-	IW	-	-	-	-	-	-

Notes:
[1] Dissolved parameter unless otherwise indicated.
[2] Primary screening criteria applied are CSR standards for Aquatic Life (AW), Drinking Water (DW), Livestock (LW) and Irrigation (IW).
[3] ' –' denotes result below primary screening criteria for given constituents.

Table M: Summary of Constituents above Primary Screening Criteria for Study Area 3 (2/2)

Constituent[1,2]	GH_MW-RLP-1D			
	Q1	Q2	Q3	Q4
Fluoride	IW, DW, LW	IW, DW, LW	IW, DW, LW	IW, DW, LW

Notes:
[1] Dissolved parameter unless otherwise indicated.
[2] Primary screening criteria applied are CSR standards for Aquatic Life (AW), Drinking Water (DW), Livestock (LW) and Irrigation (IW).

Dissolved lithium concentrations are inferred to originate from natural sources and are naturally high across the Elk Valley. Dissolved manganese at GH_POTW15 is inferred to be naturally elevated due to limited interaction with atmosphere based on the review completed in the 2017 RGMP Update (SNC-Lavalin, 2017a). Monitoring well GH_MW-RLP-1D is interpreted to be relatively hydraulically isolated from groundwater or surface water systems that would be mine-influenced. Fluoride concentrations at this location are interpreted to be naturally occurring and derived from water interaction with unconsolidated materials (SNC-Lavalin, 2017a; 2018b). Irrigation wells are not located in Study Area 3; therefore, there is no exposure pathway for these constituents. Drinking water wells in Study Area 3 include GH_POTW06, GH_POTW09, GH_POTW10, GH_POTW15, and GH_POT17. Drinking water source locations for these wells include the dryer building, gatehouse building, office complex, and processing plant, which are sampled weekly for bacteria and quarterly for the full analytical suite of groundwater parameters. The five supply wells are sampled directly every quarter, including four wells as part of the RGMP (excluding GH_POTW06).

4.5.3 Discussion

Dissolved selenium at GH_POTW17 increased to a historical high in Q2 (13.2 µg/L) and subsequently decreased to below the primary screening criteria, consistent with historical results. At GH_POTW09 (located inferred downgradient of GH_POTW17) the September 2018 the concentration increased to a historical high of 185 µg/L and subsequently decreased to 3.39 µg/L in October 2018 similar to historical ranges (Appendix VI, Graph 3-2). It is noted that the Q3 dissolved selenium concentration in Greenhills Creek (GH_GH1) was similar (183 µg/L; Appendix VI, Graph 3-2). Sulphate concentrations remained within historical ranges in 2018 at both GH_POTW17 and GH_POTW09.

Generally, silt and clay units at surface in the Fording River valley bottom provide a barrier to downward transport of CI to the aquifer with water supply wells. Overall, dissolved selenium concentrations in the Fording River at GH_FR1 and Greenhills Creek GH_GH1 were consistently higher than groundwater concentrations at RGMP wells and GH_MW-RLP-1D in Study Area 3 (Appendix VI, Graph 3-2), suggesting down-valley transport in groundwater is not significant compared to surface water. However, similar concentrations of dissolved selenium measured at GH_POTW09 in Q3 2018 to surface water from Greenhills Creek is indicative that contributions of CI from surface water to groundwater appears to exist. The pumping rates and water levels for this well are unknown. Having pumping rates and water level data for supply wells (GH_POTW09, GH_POTW10, GH_POTW15, and GH_POTW17) will help with the understanding of fluctuations in CI concentrations measured over time. Comparison of groundwater quality in this aquifer to the Fording River (GH_FR1) indicates that concentrations of dissolved selenium were approximately one order of magnitude lower; however, sulphate concentrations were relatively similar or higher (GH_POTW17) compared to surface water in the Fording River (Appendix VI, Graph 3-3). The sulphate may be naturally sourced or a result of infiltration from Greenhills Creek over the alluvial fan. If the latter is occurring, then associated dissolved selenium contributions from Greenhills Creek may have preferentially attenuated in the aquifer.

Monitoring well GH_MW-RLP-1D is in the upland area of Greenhills Creek downgradient of the rail loop area and in the Greenhills alluvial fan. There were no significant variations or trends in dissolved selenium at GH_MW-RLP-1D (Appendix VI, Graph 3-2); however, concentrations of sulphate have been decreasing since 2016, from 43.8 mg/L (September 2016) to less than the DL (November 2018; Appendix VI, Graph 3-3). Reducing conditions at GH_MW-RLP-1D are indicative of the potential for selenium attenuation in groundwater in the Fording River valley bottom in Study Area 3.

4.6 Study Area 4: Elk River Valley Bottom Downgradient of Leask, Wolfram, and Thompson Creeks

Study Area 4 is situated downgradient from the west side of GHO and was selected because the GHO SSGMP identified potential sources of CI from the Mickelson, Leask, Wolfram, and Thompson Creek drainages. Study Area 4 includes four monitoring wells (GH_GA-MW-2, GH_GA-MW-3, GH_GA-MW-4, and GH_MW-ERSC-1), one water supply well (RG_DW-01-03), and one domestic well (RG_DW-01-07). The SSGMP also identified surface water and upland groundwater infiltration as transport pathways from these potential sources to the Elk River valley bottom. Surface water from each of these creeks is diverted to settling ponds near the valley bottom and groundwater in upland areas is inferred to flow toward the Elk River valley bottom.

Valley-bottom deposits are predominantly fluvial and glaciofluvial in this area (Appendix VII) with a number of former Elk River channels identified; however, the strata in boreholes at GH_GA-MW-2 were lower permeability till and lacustrine/glaciolacustrine (i.e., soft, silty clay) sediment. To the south at wells GH_GA-MW-3 and GH_GA-MW-4, coarse-grained sediment, including sub-angular gravel, infers glaciofluvial deposits overlying local bedrock. Monitoring well GH_MW-ERSC-1, situated approximately 1 km south of the Lower Thompson Creek Settling Pond, is installed in inferred fluvial sand and gravel. The linear distribution of the monitoring wells in the valley bottom does not allow for triangulation for determining groundwater flow direction; however, groundwater is expected to discharge to the Elk River, with a flow component parallel or sub-parallel to the river. Cross-section F-F' depicts the surficial geology, approximately parallel to the Elk River (Drawing 661460-317).

4.6.1 Groundwater Levels

Groundwater elevations at GH_GA-MW-2, GH_GA-MW-3, GH_GA-MW-4, and GH_MW-ERSC-1 from January 2015 to December 2018 were plotted on a time-series graph (Appendix VI, Graph 4-1). Groundwater elevations display a seasonal trend with generally higher groundwater elevations during the spring freshet from mid-March to June. More pronounced seasonal trends have historically been recorded at monitoring well GH_GA-MW-3, with elevations fluctuating by approximately 7 m in 2018.

4.6.2 Groundwater Quality

Time-series plots for dissolved selenium, nitrate, and sulphate are presented in Appendix VI, Graphs 4-2, 4-3, and 4-4, respectively, on a logarithmic scale, based on the range of concentrations. A summary of results above primary and secondary screening criteria for Study Area 4 is presented in Table N and Table O.

Table N: Summary of Constituents above Primary Groundwater Screening Criteria for Study Area 4 (1/2)

Constituent[1,2,3]	GH_GA-MW-4				GH_GA-MW-2				GH_GA-MW-3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Nitrate	-				DW	-	-	-	-	-	-	-
Selenium	-				AW, IW, LW, DW	-	DW	DW	-	AW, IW, LW, DW	-	DW
Lithium	DW				DW				DW			
Molybdenum	-				-	IW, LW	IW, LW	IW, LW	-	-	-	-

Notes:
[1] Dissolved parameter unless otherwise noted.
[2] Primary screening criteria applied are CSR standards for Aquatic Life (AW), Drinking Water (DW), Livestock (LW) and Irrigation (IW).
[3] '–' denotes result below primary screening criteria for given constituents.

Table O: Summary of Constituents above Primary Groundwater Screening Criteria for Study Area 4 (2/2)

Constituent[1,2,3]	GH_MW-ERSC-1				RG_DW-01-03				RG_DW-01-07			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Nitrate	DW	-			-				-			
Selenium	AW, DW, IW, LW	-			-				-			
Lithium	DW	-			-				-			

Notes:
[1] Dissolved parameter unless otherwise noted.
[2] Primary screening criteria applied are CSR standards for Aquatic Life (AW), Drinking Water (DW), Livestock (LW) and Irrigation (IW).
[3] '–' denotes result below primary screening criteria for given constituents.

Dissolved molybdenum concentrations are considered to be naturally occurring and derived from interaction with bedrock. This parameter is not considered a concern. Elevated concentrations of dissolved lithium, relative to the CSR DW standard are consistent with historical results and interpreted to be naturally high across the Elk Valley.

Table P shows the summary of results above secondary screening criteria in groundwater.

Table P: Summary of Constituents above Secondary Screening Criteria for Study Area 4

Constituent[1,2,3]	GH_GA-MW-2				GH_GA-MW-3				GH_MW-ERSC-1			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Selenium	CP, SPO	-	-	-	-	CP, SPO	-	-	DW, SPO, CP	-		

Notes:
[1] Secondary screening criteria are Site Performance Objective (SPO), Compliance Point (CP) and GCDWQ for drinking water (DW).
[2] '–' denotes result below secondary screening criteria.

4.6.3 Discussion

Groundwater quality is discussed by tributary drainage proximal to each monitoring well.

4.6.3.1 Leask Creek

Monitoring well GH_GA-MW-4 is downgradient of Leask Creek, near Leask Pond, and concentrations of dissolved selenium, nitrate-nitrogen and sulphate concentrations have decreased by up to 17 times since sampling began (Appendix VI, Graphs 4-2, 4-3, and 4-4). It has been interpreted that groundwater at GH_GA-MW-4 has been more recently influenced by infiltration of the Elk River and less by mine-influenced surface water from Leask Creek/Pond, as demonstrated through changes in water type and groundwater level fluctuations similar to the Elk River (SNC-Lavalin, 2019b). The decreased Cl concentrations at this location indicates that down-valley transport of mine-influenced groundwater from the Leask Creek/Pond area is of decreased importance.

4.6.3.2 Wolfram Creek

Monitoring well GH_GA-MW-2 is situated in the vicinity of Wolfram Pond, at the base of Wolfram Creek. Cl concentrations greater than the applicable criteria have historically been measured in surface water in

Wolfram Pond (GH_WC1); however, they have been orders-of-magnitude greater than groundwater at GH_GA-MW-2 (Appendix VI, Graphs 4-2, 4-3, and 4-4). A direct hydraulic connection between surface water and groundwater is not expected as GH_GA-MW-2 is a deep well situated under a number of locally confining units (Drawing 661460-317); however, groundwater in this area is interpreted to be seasonally influenced by surface water (SNC-Lavalin, 2019b).

The surface water influence is interpreted to be an interplay between infiltration from the Elk River side channel and Wolfram Creek/Pond as described in SNC-Lavalin (2019b). Since Q3 2017, groundwater at GH_GA-MW-2 appears to be more influenced by mine-influenced surface water from Wolfram Creek than in previous years. This is inferred to result in the spike in nitrate-nitrogen and dissolved selenium in Q1 2018, but also the increasing sulphate concentrations since sampling began in 2014 (SNC-Lavalin, 2019b). Since increasing mine-influence appears to be present at GH_GA-MW-2, there appears to be the potential for down-valley transport of mine-influenced groundwater; however, it is considered a secondary transport pathway to surface water.

4.6.3.3 Thompson Creek

Monitoring well GH_GA-MW-3 is downgradient of Thompson Creek and Lower Thompson Pond, but upgradient of the Elk River side channel. In Q2, marked increases in dissolved selenium, nitrate, and sulphate were measured at GH_GA-MW-3; however, concentrations remained within historical ranges and were consistent with values measured prior to 2016 (Appendix VI, Graphs 4-2, 4-3, and 4-4). SNC-Lavalin (2019a) reported that this well appears to be more influenced by Thompson Creek than the Elk River side channel; and increasing influence of the side channel was inferred based on an overall decreasing trend of Cl since Q1 2015, changes in water type over time and groundwater elevations. It was noted, however, that the side channel displays some seasonal mine influence and therefore groundwater may still be affected. As such, down-valley transport of mine-influenced groundwater from this area has the potential to occur; however, it is considered a secondary transport pathway to surface water.

4.6.3.4 Downgradient of Thompson Creek

The relatively high concentrations of Cl (i.e., either approaching or above primary criteria) at GH_MW-ERSC-1, except in Q4, in comparison to surface water concentrations at Elk River surface water station GH_ERC (located adjacent to GH_MW-ERSC-1) suggest a groundwater pathway may exist at this location. This well is downgradient of Thompson Creek near the confluence of the Elk River side channel and the Elk River. Itis completed in a sand unit above bedrock (logged as a till) with a hydraulic conductivity of 3×10^{-6} m/s. Between Q4 2017 and Q1 2018, concentrations of Cl at GH_MW-ERSC-1 were much higher than at upgradient wells GH_GA-MW-2 and GH_GA-MW-3, suggesting a greater mine-influence (Appendix VI, Graphs 4-2, 4-3, and 4-4). The SSGMP did not identify sources in the vicinity and there are no adjacent tributary drainages; however, well GH_MW-ERSC-1 is situated approximately 45 m from the Elk River side channel which receives surface flows from tributaries in Thompson Creek and Wolfram Creek. Consequently, it is possible that the intermittent elevated concentrations may be due to infiltration from surface water in the side channel. The 2017 RGMP Annual Report indicated that a localized gap exists in the vicinity of the side channel (SNC-Lavalin, 2018a). Additional studies assessing the relationship between the Elk River side channel and groundwater at GHO are ongoing in the GHO Local Aquatic Effects Program (LAEMP).

Downgradient groundwater quality in the Elk River valley bottom improves, and delineation (i.e., extent of mine-influenced groundwater) is achieved on a regional scale. Dissolved selenium concentrations in the valley-bottom groundwater were below screening criteria at the water supply well RG_DW-01-03, with concentrations decreasing farther downgradient of Elkford at domestic well location RG_DW-01-07. This

suggests attenuation in the valley-bottom groundwater down-valley flowpath, likely due to mixing with surface water and additional fresh water inputs.

4.7 Study Areas 5 and 6: Fording River Valley Bottom Downgradient of LCO

Study Area 5 was selected because the LCO SSGMP identified possible inputs of CI from Line Creek and the Process Plant to Fording River valley bottom. After exiting LCO Phase I area, Line Creek flows through incised bedrock towards the Fording River, losing approximately 60 m in elevation (from about 1,300 masl) over an alluvial fan. Study Area 6 was selected as it spans the Elk River valley bottom and is downgradient of the LCO Process Plant (AMEC, 2010). Additionally, Study Areas 5 and 6 were selected as the RDW Sampling Program identified elevated selenium in groundwater downgradient of the confluence of the Fording and Elk rivers.

Bedrock at the confluence of the Fording and Elk rivers may locally affect river grade and restrict groundwater recharge to the valley bottom (SNC-Lavalin, 2015). In this area, surficial geology indicates that the depositional environment in the valley bottom was glaciofluvial and fluvial (Appendix VII). Bedrock elevations and detailed surficial stratigraphy, well installation details, and groundwater elevations in Study Areas 5 and 6 are presented on cross-sections G-G' and H-H' (Drawings 661460-318 and 661460-319). Cross-section G-G' is perpendicular to groundwater flow and extends from Fording River to the north to the East Refuse Expansion to the south. Cross-section H-H' is parallel to groundwater flow and extends from Line Creek in the northeast to the Elk River in the southwest. For the RGMP, there are no monitoring wells within Study Area 5 or 6, with one monitoring well, LC_PIZP1101, located upgradient of Study Area 6 (Drawing 661460-309). Monitoring well LC_PIZP1101 is screened in a deeper sand aquifer at approximately 41 mbgs.

4.7.1 Groundwater Levels

Manual and level logger groundwater elevations measured from March 2015 to May 2018 in monitoring well LC_PIZP1101 were plotted on a time-series graph and included in Appendix VI (Graph 6-1). Groundwater elevations in LC_PIZP1101 were approximately 1 m lower from October 2017 to May 2018, as compared to historically recorded water levels.

4.7.2 Groundwater Quality

A summary of results above primary screening criteria for Study Area 6 is presented Table Q.

Table Q: Summary of Constituents above Primary Screening Criteria for Study Area 6

Constituent[1,2]	LC_PIZP1101			
	Q1	Q2	Q3	Q4
Fluoride	IW, LW, DW	IW, LW, DW	IW, LW, DW	IW, LW, DW
Lithium	DW	DW	DW	DW
Manganese	IW	IW	IW	IW
Molybdenum	IW	IW	IW	IW

Notes:
[1] Dissolved parameter unless otherwise indicated.
[2] Primary screening criteria applied are CSR standards for Aquatic Life (AW), Drinking Water (DW), Livestock (LW) and Irrigation (IW).

Groundwater quality in LC_PIZP1101 was below the primary screening criteria concentrations for all the CI, but exceeded the primary screening criteria for other constituents. Results from 2018 were similar to previous years and consistent with findings from the 2017 RGMP Update (SNC-Lavalin, 2017a). Review of the borehole log for LC_PIZP1101 (provided in Appendix III) indicates this well is installed in a deep sand aquifer, with limited interaction with atmosphere and connection to surface water. The source of fluoride, manganese and molybdenum is likely from natural sources and lithium concentrations are naturally high across the Elk Valley (SNC-Lavalin, 2017a).

4.7.3 Discussion

Groundwater from the LCO Process Plant Site flows towards Study Area 6; however, concentrations of CI are low and near the detection limit. This is consistent with historical results from several wells situated in the Process Plant Site. To assess groundwater and surface water interactions, selenium concentrations measured in groundwater at LC_PIZP1101 were compared to concentrations in surface water in Line Creek (LC_LC4) and in the Elk River downstream of Study Area 6 (EV_ER4), respectively (Appendix VI; Graph 6-2). Concentrations in groundwater at LC_PIZP1101 have been relatively low and stable since May 2013 and are substantially lower than concentrations measured in Line Creek and in the Elk River. Consequently, the most significant pathway for mine-influenced water in Study Areas 5 and 6 is through surface water from Line Creek.

The 2017 RGMP Update indicated there is a data gap for the Elk River valley-bottom aquifer downgradient of LCO, and as such local groundwater conditions are unknown (SNC-Lavalin, 2017a). The existing monitoring wells proposed for inclusion in the 2017 RGMP Update to intercept the unconfined sand and gravel aquifer (e.g., LC_PIZP1102); however, it is likely that another monitoring well in the valley bottom will be required to fill this gap.

4.8 Study Area 7: Elk River Valley Bottom Downgradient of Grave Creek

This area was selected because the EVO SSGMP identified potential sources of CI in the Harmer Creek drainage. Tributary surface water (i.e., Harmer Creek that flows to Grave Creek) and valley-bottom groundwater ultimately flows into the Elk River valley bottom. Additionally, samples from the RDW Sampling Program (i.e., RG_DW-02-20) historically exceeded the primary screening criteria (AW and DW) for selenium; however, it is noted that historical dissolved selenium concentrations at RG_DW-02-20 no longer exceed the CSR AW standards due to the adjusted CSR standard which increased from 10 µg/L to 20 µg/L in 2017 (BC ENV, 2019).

The surficial geology in the Grave Creek drainage is mapped as colluvium; however, borehole logging at monitoring well EV_GV3gw indicates a relatively large thickness (i.e., up to 25 m) of loose sand and sub-angular gravel and silty gravel deposits. This well is situated near the confluence of Grave and Harmer Creeks, and thicker sediments in this area may be reflective of the Grave Creek alluvial fan. The groundwater level at EV_GV3gw is relatively deep, approximately 10 mbgs, with a saturated thickness of approximately 15 m. Based on a comparison of groundwater elevation with the elevation of Grave Creek, the creek appears to have a losing reach in this area, and accordingly the creek is interpreted to be losing

along the approximate 120 m drop in elevation to the Elk River (Appendix VII). As such, groundwater from the Grave Creek valley bottom is interpreted to flow into the Elk River valley bottom.

The monitoring wells included in Study Area 7 are monitoring well EV_GV3gw, which monitors upland and tributary valley-bottom input from drainage to the northeast of EVO, and the domestic well RG_DW-02-20 that monitors groundwater in the Elk River valley bottom. Monitoring wells and relevant surface water locations for Study Area 7 are shown on Drawing 661460-309. Drawing 661460-320, cross-section I-I', shows the inferred geology parallel to groundwater flow in the valley bottom in Study Area 7.

4.8.1 Groundwater Levels

Manual and level logger groundwater elevations measured from January 2015 to December 2018 in monitoring well EV_GV3gw were plotted on a time-series graph and included in Appendix VI (Graph 7-1). Groundwater elevations in EV_GV3gw followed a seasonal trend with higher groundwater levels recorded in spring months and annual water level fluctuations up to 0.8 m. Annual maximums in spring of 2017 and 2018 were approximately 0.3 m higher than spring of 2015 and 2016.

4.8.2 Groundwater Quality

A summary of results above primary screening criteria for Study Area 7 is presented in Table R.

Table R: Summary of Constituents above Primary Screening Criteria for Study Area 7

Constituent[1,2,3]	RG_DW-02-20				EV_GV3gw			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Selenium	DW	DW	-	-	-	-	-	-
Lithium	-	-	-	-	DW	DW	DW	DW

Notes:
[1] Dissolved parameter unless otherwise indicated.
[2] Primary screening criteria applied are CSR standards for Aquatic Life (AW), Drinking Water (DW), Livestock (LW) and Irrigation (IW).
[3] ' –' denotes result below primary screening criteria.

Secondary screening was performed for dissolved selenium concentrations in well RG_DW-02-20 and all results were below the secondary screening criteria. There were no CI concentrations detected above primary screening standards at EV_GV3gw. Dissolved lithium was the only constituent measured above CSR standards in all samples collected in 2018 from EV_GV3gw; concentrations were similar to those measured in 2015-2017. Lithium concentrations are interpreted to be naturally high across the Elk Valley (SNC-Lavalin, 2017a).

4.8.3 Discussion

Discussion of trends in groundwater quality in Study Area 7 focuses on dissolved selenium which was above the primary screening criteria in domestic well RG_DW-02-20. Drawings 661460-331 to -334 show the spatial distribution of CI for samples collected in Study Area 7. To assess groundwater and surface water interactions, selenium concentrations measured in groundwater at EV_GV3gw and RG_DW-02-20 were compared to concentrations in surface water in Harmer Creek (EV_HC1) and in the Elk River upstream from the confluence with Grave Creek (EV_ER4), respectively (Appendix VI, Graph 7-2).

Concentrations in groundwater at EV_GV3gw have been stable since November 2013 and are substantially lower than concentrations measured in Harmer Creek at EV_HC1 and also lower than concentrations in Elk River upstream from the confluence with Grave Creek. Concentrations measured at RG_DW-02-20 appear to follow a seasonal trend with the highest concentrations measured during the spring months and were generally within the range of concentrations measured upstream in the Elk River at EV_ER4, but considerably lower than surface water concentrations in Harmer Creek.

Loading of mine-influenced constituents to groundwater valley bottom in Study Area 7 is inferred to be primarily from infiltration of Elk River surface water as CI concentrations measured at RG_DW-02-20 reflect Elk River surface water quality. As such, there is no groundwater transport pathway identified. Also, significant groundwater transport of CI from the Harmer Creek drainage to the Elk River valley bottom is inferred to be minimal based on relatively low groundwater concentrations measured in Harmer Creek drainage at EV_GV3gw compared to surface water at EV_HC1. Therefore, transport of CI from the Harmer Creek drainage to groundwater in the Elk River valley bottom is primarily through surface water.

4.9 Study Area 8: Elk River Valley Bottom Downgradient of Balmer, Lindsay and Otto/Cossarini Creeks

This area was selected because the EVO SSGMP identified potential sources of CI on the western slope of EVO and potential transport in the Lindsay, Otto/Cossarini drainages as well as the Goddard Marsh area (Drawing 661460-310); tributary surface water and upland groundwater flow into the Elk River valley bottom in these areas. Groundwater in Study Area 8 will eventually discharge to the Elk River or flow to the valley bottom of the Elk River in Study Area 12.

The valley bottom consists mainly of fluvial, glaciofluvial and alluvial fan deposits in this area as the area is near the confluence with Cummings Creek. Underlying the coarse units are finer-grained deposits of lower permeability silt and clay suggesting relatively thick lacustrine/glaciolacustrine deposits exist in the subsurface (see Appendix VII). Groundwater flow in upland areas is inferred to be toward the Elk River valley bottom. Groundwater flow direction in the valley bottom is assumed to be parallel or sub-parallel to the Elk River. Inferred geological cross-sections J-J' and K-K' (Drawings 661460-321 and -322, respectively) depict stratigraphy parallel and perpendicular to the inferred groundwater flow direction.

The monitoring wells in Study Area 8 included the monitoring wells EV_LSgw and EV_OCgw to monitor potential inputs from upland, tributary valley bottom, and Elk River valley bottom features along the western slope of EVO. Monitoring wells and relevant surface water locations for Study Area 8 are shown on Drawing 661460-310.

4.9.1 Groundwater Levels

Manual and level logger groundwater elevations measured from January 2015 to October 2018 in monitoring wells EV_LSgw and EV_Ocgw were plotted on a time-series graph and included in Appendix VI (Graph 8-1). Groundwater elevations in both wells show a seasonal trend with slightly higher groundwater elevations in the spring. Annual maximums in 2018 were lower than 2017, and similar to spring of 2015 and 2016.

4.9.2 Groundwater Quality

A summary of results above primary screening criteria for Study Area 8 is presented in Table S.

Table S: Summary of Constituents above Primary Screening Criteria for Study Area 8

Constituent[1,2,3]	EV_LSgw				EV_OCgw[4]			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Fluoride	-	-	-	-	IW, LW	IW, LW	IW, LW	IW, LW
Lithium	DW	DW	DW	DW	DW	DW	DW	DW
Manganese	IW	IW	IW	IW	-	-	-	-
Molybdenum	-	-	-	-	IW	IW	IW	IW

Notes:
1 Dissolved parameter unless otherwise indicated.
2 Primary screening criteria applied are CSR standards for Aquatic Life (AW); Drinking Water (DW), Livestock (LW) and Irrigation (IW) except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG for AW.
3 '–' denotes result below primary screening criteria for given constituents.
4 Well is located within 10 m of surface water and results are compared to BCWQG for AW.

Results from 2018 were similar to previous years and consistent with findings from the 2017 RGMP Update (SNC-Lavalin, 2017a). Review of the borehole log for EV_OCgw (provided in Appendix III) indicates this well is installed directly overlying the bedrock surface suggesting the source of fluoride and molybdenum likely originates from bedrock. Field measured DO values in 2018 from EV_LSgw ranged from 0.15 to 0.39 mg/L, suggesting the source of manganese at this well may be related to reducing conditions due to limited interactions with the atmosphere. Lithium concentrations are interpreted to be naturally high across the Elk Valley (SNC-Lavalin, 2017a).

4.9.3 Discussion

Cl in groundwater were below primary screening criteria in Study Area 8. To assess groundwater and surface water interactions, selenium concentrations measured in groundwater in Study Area 8 were compared to concentrations in surface water in adjacent creeks. Adjacent surface water chemistry data indicated selenium concentrations above BCWQG for AW; therefore, discussion of chemistry trends in Study Area 8 is focused on selenium.

Dissolved selenium concentrations in groundwater at EV_LSgw and EV_OCgw have been relatively stable since 2013 (Appendix VI, Graph 8-2). Consistent with findings from previous annual reports, selenium concentrations in surface water were approximately two orders of magnitude higher compared to groundwater concentrations in the Elk River drainage area (Appendix VI, Graph 8-2). Groundwater in the Balmer Creek and Lindsay Creek catchments was inferred to be reflective of surface water

(SNC-Lavalin, 2018c). Surface water from Goddard Creek (EV_GC2) is interpreted to lose to ground near Goddard Settling Ponds and Goddard Marsh, and may influence groundwater quality in this area which was identified as a data gap in the 2017 RGMP Update (SNC-Lavalin, 2017a). With the exception of Goddard Creek, there does not appear to be a confirmed groundwater transport pathway between the surface water sources identified on the western slope of EVO and Elk River valley bottom (SNC-Lavalin, 2017a).

4.10 Study Area 9: Michel Creek Valley Bottom Downgradient of EVO (including Sparwood Area)

This area was selected as the EVO SSGMP identified potential sources of CI that may contribute to mine-influenced groundwater in the Michel Creek valley bottom. Study Area 9 is situated adjacent to EVO and receives tributary surface water and upland groundwater flow from potential sources along the southwestern slope of EVO. The boundaries of Study Area 9 were modified as part of the 2017 RGMP Update (SNC-Lavalin, 2017a) to reflect information from the EVO monitoring program and now extend from South Gate Creek to the confluence of Michel Creek with the Elk River (Drawing 661460-310). It is noted that Study Area 9 has significant overlap with the Sparwood Area, established as part of Permit 107501 requirements and has also been listed as a Study Area in the 2017 RGMP Update. At the time of issue of the 2017 RGMP Update, the Sparwood Area did not have any dedicated monitoring wells; however, new wells have since been drilled as part of the Sparwood Area Groundwater Supporting Study. The results from these wells are preliminary and due to the spatial overlap with Study Area 9 they have been presented in this Section.

The Michel Creek valley bottom consists mainly of fluvial and glaciofluvial deposits, with a glaciolacustrine clay/silt unit to the northwest that increases in thickness along the valley axis (Table 2). The sand and gravel aquifer are unconfined with saturated thickness up to 64 m. Upland groundwater flow in the tributary drainages either discharges to the creeks or flows as a thin saturated zone to the Michel Creek valley bottom. Flow direction in the valley bottom is parallel or sub-parallel to Michel Creek, based on monitoring of recently installed wells (see below). Cross-sections L-L' and M-M' (Drawings 661460-323 and -324) are located parallel and perpendicular, respectively, to the inferred groundwater flow direction.

To monitor Michel Creek valley-bottom groundwater in Study Area 9, the following wells were included: three water supply wells (EV_RCgw, EV_WH50gw and EV_BRgw); three monitoring wells (EV_BCgw and EV_MCgwS/D [nested]); and one domestic well (RG_DW-03-01) to monitor valley-bottom groundwater in Michel Creek. Additional wells were drilling in Study Area 9 and the Sparwood Area in early 2019 and are shown on Drawing 661460-310 for reference. The results from monitoring of these wells are not presented as part of the 2018 Annual Report for the RGMP although preliminary results and a comment on the related data gaps are included in the discussion below. Detailed analysis and results from these wells will be presented in a separate report for Study Area 9 and the Sparwood Area. The preliminary results from additional wells reviewed included the following:

- three nested wells (EV_MW_SC1-A/B/C) to assess down-valley groundwater transport of mine-influenced groundwater in the Michel Creek valley;
- one well (EV_MW_AQ1) to assess influence of infiltration of Aqueduct Creek in the Michel Creek valley bottom;
- three wells (EV_MW_AQ2, EV_MW_MC3 and EV_MW_MC4) to assess subsurface geology and groundwater transport from bedrock into overburden sediments at the base of Baldy Ridge;

- two nested wells (EV_MW_BC1-A/B) to assess hydrostratigraphic units of elevated CI in EV_RCgw and determine localized groundwater flow direction to evaluate down-valley transport of CI in Michel Creek valley bottom;
- two nested wells (EV_MW_GC1-A/B) to assess hydrostratigraphic units of elevated CI, determine localized groundwater flow direction particularly in relation to groundwater discharges to Michel Creek;
- two nested wells (EV_MW_MC1-A/B) to determine extent of mine-influenced groundwater and localized groundwater flow direction in the Michel Creek valley bottom; and
- two nested wells (EV_MW_MC2-A/B) to confirm hydrostratigraphic units of elevated CI in EV_HW1 and determine localized groundwater flow direction to evaluate down-valley transport of CI.

4.10.1 Groundwater Levels

Manual and level logger groundwater elevations measured from January 2015 to October 2018 in monitoring wells EV_BCgw and EV_MCgwS/D were plotted on a time-series graph and included in Appendix VI (Graph 9-1). Groundwater elevations in all three wells followed a seasonal trend with annual maximums in spring of 2017 and 2018 approximately 0.2 m to 0.5 m higher than spring of 2015 and 2016. The vertical groundwater gradient at the nested well EV_MCgwS/D was downwards ranging from -0.032 to -0.044 m/m, which was slightly lower than previously calculated values from 2015 to 2017 which were -0.08 to -0.04 m/m (Table 3).

4.10.2 Groundwater Quality

A summary of results above primary screening criteria for Study Area 9 is presented in Table T (monitoring wells) and Table U (supply and domestic wells).

Table T: Summary of Constituents above Primary Screening Criteria for Study Area 9 (Monitoring Wells)

Constituent[1,2,3]	EV_BCgw				EV_MCgwS				EV_MCgwD			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Selenium	AW, IW, LW, DW	AW, IW, LW, DW	AW, IW, LW, DW	AW, IW, LW, DW	-				-	-	-	-
Fluoride	-	-	-	-	-				-	IW, LW	IW, LW	-
Lithium	DW	DW	DW	DW	DW				DW	DW	DW	DW
Manganese	-	-	-	-	-				IW	IW	IW	-
Molybdenum	-	-	-	-	-				IW	IW	IW	IW

Notes:
[1] Dissolved parameter unless otherwise indicated.
[2] Primary screening criteria applied are CSR standards for Aquatic Life (AW); Drinking Water (DW), Livestock (LW) and Irrigation (IW).
[3] '–' denotes result below primary screening criteria for given constituents.

Results from 2018 were similar to previous years with the following exceptions.

- Fluoride at EV_MCgwD was above IW and LW standards in Q2 and Q3, although the concentrations were similar to previous years which were typically close to the standard;
- No detectable concentrations of dissolved iron at EV_MCgwD, representing a decrease of up to 3 orders of magnitude compared to 2017. Air bubbles in the sampling line resulted in anomalously high DO measurements, which may explain the decrease (SNC-Lavalin, 2019c); and
- An approximately 25% reduction in dissolved manganese was also observed at EV_MCgwD, although remaining above IW standards.

The source of dissolved manganese (EV_MCgwD) is inferred to be associated with reducing conditions (SNC-Lavalin, 2017a). The source of molybdenum at EV_MCgwD is inferred to be naturally occurring (SNC-Lavalin, 2017a; 2019c). Lithium concentrations are interpreted to be naturally high across the Elk Valley (SNC-Lavalin, 2017a).

Table U: Summary of Constituents above Primary Screening Criteria for Study Area 9 (Supply/Domestic Wells)

Constituent[1,2,3]	EV_BRgw				EV_WH50gw				EV_RCgw				RG_DW-03-01			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Selenium	AW, IW, DW	AW, IW, DW	AW, IW, LW, DW	AW, IW, LW, DW	DW	DW	DW	DW	AW, IW, LW, DW	AW, IW, LW, DW	AW, IW, LW, DW	AW, IW, LW, DW	-			
Nitrate-Nitrogen	-	-	-	-	-	-	-	-	DW	DW	DW	DW	-			
Sulphate	-	-	-	-	-	-	-	-	LW, DW	LW, DW	LW, DW	LW, DW	-			
Copper	-	-	-	-	-	-	-	-	AW	IW, LW	-	-	-			
Lithium	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW			

Notes:
1 Dissolved parameter unless otherwise indicated.
2 Primary screening criteria applied are CSR standards for Aquatic Life (AW); Drinking Water (DW), Livestock (LW) and Irrigation (IW).
3 '–' denotes result below primary screening criteria for given constituents.

The source of dissolved copper at EV_RCgw is not known and is potentially mine-influenced as concentrations of CI were also consistently measured above standards at this location. Dissolved copper was measured at historical record high concentration of 575 µg/L in Q2 of 2018. As concentrations of copper above CSR standards have only been measured at EV_RCgw, the extent appears to be localized.

Table V shows the summary of results above secondary screening criteria for Study Area 9.

Table V: Summary of Results above Secondary Screening Criteria for Study Area 9

Constituent[1,2]	EV_BCgw				EV_BRgw				EV_WH50gw				EV_RCgw			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Selenium	SPO, CP				SPO	SPO	SPO, CP	SPO, CP	-				SPO, CP, DW			

Notes:
[1] Secondary screening criteria are Site Performance Objective (SPO), Compliance Point (CP) and GCDWQ for drinking water (DW).
[2] '–' denotes result below secondary screening criteria.

4.10.3 Discussion

Discussion of trends in groundwater quality in Study Area 9 focuses on dissolved selenium, nitrate-nitrogen and sulphate concentrations that approach or were above the primary and secondary screening criteria in select wells. Drawings 661460-335 to -338 show the spatial distribution of CI for samples collected in Study Area 9. Time-series plots of dissolved selenium, nitrate-nitrogen and sulphate from the select wells from Study Area 9 are shown in Appendix VI Graphs 9-2, 9-3, and 9-4. To compare groundwater concentration trends to surface water in Study Area 9, dissolved selenium, nitrate-nitrogen and sulphate concentrations measured in nearby surface water at Bodie Creek (EV_BC1), Gate Creek (EV_GT1) and further downstream at Michel Creek (EV_MC2) were also plotted on these graphs.

Concentrations of selenium, nitrate-nitrogen and sulphate in groundwater have varied temporally but a clear seasonal trend in the concentrations was not identified based on data from 2013 to 2018 (Appendix VI Graphs 9-2, 9-3, and 9-4). The highest concentrations in dissolved selenium, nitrate-nitrogen and sulphate have been measured in water supply well EV_RCgw with levels consistently higher than concentrations measured at surface water stations EV_BC1, EV_GT1, and EV_MC2 since 2015. This is also the location where localized elevated dissolved copper concentrations were measured. The source and extent of high concentrations of these constituents measured at EV_RCgw are not well understood. If concentrations at this location remain elevated, additional investigations may be required to determine the possible source and spatial extent of the elevated CI.

Concentrations of CI in downgradient wells EV_BCgw and EV_BRgw follow a spatial pattern of reduced concentrations along the flowpath. Consistent with observations made in 2016 and 2017, attenuation of dissolved selenium, nitrate-nitrogen and sulphate appears to be occurring in the Michel Creek valley bottom suggesting attenuation along the flowpath (SNC-Lavalin, 2017a).

The preliminary results from the additional monitoring wells installed in Study Area 9 suggest that the data gaps identified in the 2017 Update (SNC-Lavalin, 2017a) have been filled, as follows.

- A triangulated monitoring well network with nested monitoring wells installed in permeable units allows for a detailed understanding of the groundwater flow regime. Preliminary data suggest a flow component and discharge towards Michel Creek, but also a down-valley underflow component of flow.
- Preliminary water quality data further support the interpretation that copper concentrations in EV_RCgw are localized.
- Preliminary water quality data suggest that CI concentrations above primary criteria are detected in wells downgradient of EV_RCgw (Drawing 661460-310) such as in EV_MW_BC1-A/B (shallow and deep) and in EV_MW_GC1-B, EV_MW_MC2-B and EV_MW_SC1-C (shallow wells only). However, wells further downgradient in the Michel Creek Valley do not have concentrations of CI above primary screening criteria (i.e., EV_MCgwS/D, EV_MW_MC1-A/B, EV_MW_MC3, EV_MW_MC4,

EV_MW_AQ1, EV_MW_AQ2, and EV_MW_SC1-A/B), suggesting that the spatial extent of mine-influenced groundwater is delineated in the deep aquifer but not in the shallow aquifer at EV_MW_SC1-C. However, concentrations of Cl in groundwater at EV_MW_SC1-C are an order of magnitude lower than the maximum detected concentration further up-valley (e.g. EV_RCgw), reflecting the attenuation of Cl along the groundwater flow path.

Further analysis of results from the additional wells installed in Study Area 9 will be presented in a separate report.

4.11 Study Area 10: Michel Creek Valley Bottom Downgradient of Erickson Creek

This area was selected as the EVO SSGMP identified waste rock spoils and other potential sources of Cl in the Erickson Creek drainage which flows into the Michel Creek valley bottom and may contribute to mine-influence groundwater in the valley bottom. The Erickson Creek valley bottom consists mainly of colluvium as shown on Drawing 661460-303. The lithology observed at EV_ECgw is consistent with surficial geology mapping and shows till underlying the colluvium (Appendix VII). Bedrock was not encountered at this location. There is no groundwater well in the Michel Creek valley-bottom aquifer in Study Area 10; however, groundwater monitoring of EV_ECgw located upgradient in the tributary has been ongoing to assess potential groundwater transport through the Erickson Creek valley bottom to groundwater in Study Area 10. The boundaries of Study Area 10 were proposed to be modified as part of the 2017 RGMP Update (SNC-Lavalin, 2017a) to reflect surface water monitoring data and extend further northwest past the confluence of Milligan Creek with Michel Creek (Drawing 661460-310). The expansion of Study Area 10, and any future groundwater studies for this area are under discussion.

The monitoring well and relevant surface water locations for Study Area 10 are shown on Drawing 661460-310.

4.11.1 Groundwater Levels

Manual and level logger groundwater elevations measured from January 2015 to October 2018 in monitoring well EV_ECgw were plotted on a time-series graph (Appendix VI, Graph 10-1) which shows groundwater elevations in EV_ECgw following a seasonal trend similar to previous years.

4.11.2 Groundwater Quality

There were no Cl concentrations above primary screening standards at EV_ECgw. A summary of results above primary screening criteria for Study Area 10 is presented in Table W.

Table W: Summary of Constituents above Primary Screening Criteria for Study Area 10

Constituent[1,2,3]	EV_ECgw			
	Q1	Q2	Q3	Q4
Lithium	-	DW	DW	DW
Molybdenum	IW	IW	IW	IW

Notes:
[1] Dissolved parameter unless otherwise indicated.
[2] Primary screening criteria applied are CSR standards for Aquatic Life (AW); Drinking Water (DW), Livestock (LW) and Irrigation (IW).

[3] '–' denotes result below primary screening criteria for given constituents.

Results from 2018 were similar to previous years with a few exceptions. Dissolved molybdenum at EV_ECgw is inferred to be naturally occurring based on the low estimated hydraulic conductivity value (1 x 10^{-8} m/s) of the screened interval suggesting relatively slow groundwater velocities and no direct connection to surface water. Lithium concentrations are naturally high across the Elk Valley.

4.11.3 Discussion

Groundwater quality in EV_ECgw was below all primary screening criteria for the CI in 2018. To assess groundwater and surface water interaction in the Erickson drainage and potential mine-influence to the Michel Creek valley-bottom sediments, selenium concentrations measured in shallow groundwater at EV_ECgw were compared to concentrations in surface water at the mouth of Erickson Creek (EV_EC1) and Michel Creek (EV_MC3) upstream from Erickson Creek discharge. A time-series plot of dissolved selenium from the selected well and surface water stations located in Study Area 10 is shown in Appendix VI (Graph 10-2).

Dissolved selenium concentrations in groundwater at EV_ECgw have been stable since March 2014 with no distinct seasonal trend observed. Selenium concentrations measured in groundwater at EV_ECgw were three orders of magnitude lower than surface water concentrations measured in EV_EC1. Comparison of ion balance and water type suggests that groundwater at EV_ECgw is not hydraulically connected to surface water in the area (SNC-Lavalin, 2018c).

Significantly higher (i.e., orders of magnitude) dissolved selenium concentrations exist in surface water at the South Pit Creek Sediment Pond Decant (EV_SP1), located in the valley bottom within Study Area 10 and the Milligan Creek Sediment Pond Decant (EV_MG1), located in the valley bottom downgradient of Study Area 10. In the absence of monitoring wells in the Michel valley-bottom aquifer in Study Area 10, groundwater quality is unknown and was identified as a data gap in the 2017 RGMP Update (SNC-Lavalin, 2017a). However, mine-influence on groundwater is likely to be the result of infiltration of impacted surface water rather than tributary groundwater transport.

In 2019, a drilling program was completed in the Erickson Creek valley bottom to assess water quality and hydraulic parameters underlying the Erickson Creek floodplain as part of the EVO AWTF program (Golder, 2019b). Two boreholes were drilled in clayey silt and sand/clayey sand material to 59 mbgs (EV_MW-EC1) and 40 mbgs (EV_MW-EC2) and artesian conditions were encountered at both locations. Prior to capping the boreholes, artesian flows were sampled, and results indicated that dissolved selenium concentrations were measured at very low concentrations in groundwater compared to much higher values measured in Erickson Creek. Groundwater quality results, artesian conditions, and surficial geology (creating confining conditions) suggest that there is no groundwater pathway for mine-influenced water in the Erickson Creek drainage. This further supports the interpretation that mine-influence is predominantly in surface water.

4.12 Study Area 11: Michel Creek Valley Bottom Downgradient of CMO

This area was selected as it was identified to be the focal point of groundwater flow at CMO immediately downgradient of the confluence of Michel and Corbin Creeks in the CMO SSGMP. Potential sources of CI exist upgradient of this area and may contribute to the mine influences in groundwater in the Michel Creek valley bottom. Study Area 11 consists of Michel Creek valley-bottom deposits downgradient of CMO (Drawing 661460-311).

Mining activities at CMO are along a north-south trending ridge bordered by steep mountain ranges to the east and west. Michel Creek flows south to north along the west side of the site. Corbin Creek flows south to north along the east side of the mine site and flows west at the north end of the site before it flows into Michel Creek in the northwest corner of the site. CMO is therefore isolated from other mountain ranges in the Elk Valley. The valley bottoms in Study Area 11 are infilled with till and glacial outwash deposits, as well as modern fluvial sands and gravels associated with Michel and Corbin Creeks (Appendix VII). Valley-bottom deposits in this area were identified as the primary migration pathway outside of mine-permitted areas from CMO. The monitoring locations in Study Area 11 include a nested monitoring well (CM_MW1-OB/SH/DP) installed downgradient of CMO at the confluence of Michel and Corbin creeks. Monitoring wells and relevant surface water locations for Study Area 11 are shown on Drawing 661460-311.

4.12.1 Groundwater Levels

Manual groundwater elevations measured from August 2015 to November 2018 in monitoring well CM_MW1-OB/SH/DP were plotted on a time-series graph (Appendix VI, Graph 11-1). Groundwater levels do not vary significantly in each of the three wells. Vertical groundwater flow is inferred to be downwards from the shallow gravel aquifer to the bedrock aquifer, and upward from the deeper bedrock to the shallower bedrock. The calculated vertical hydraulic gradients between CM_MW1-OB and CM_MW1-SH varied from -0.0049 to -0.059 m/m and between CM_MW1-SH and CM_MW1-DP varied from 0.037 m/m to 0.072 m/m (Table 3).

4.12.2 Groundwater Quality

A summary of results above primary screening criteria for Study Area 11 is presented in Table X.

Table X: Summary of Constituents above Primary Screening Criteria for Study Area 11

Constituent[1,2,3]	CM_MW-1-OB				CM_MW-1-SH				CM_MW-1-DP			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sulphate	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	-	-	IW	IW	IW	IW	IW	IW	IW	IW	IW	IW
Sodium	-	-	-	-	-	-	-	-	DW	DW	DW	DW
Barium	-	-	-	-	-	-	-	-	DW	DW, AW	DW, AW	DW
Lithium	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW
Molybdenum	-	-	-	-	IW, LW	IW, LW	IW, LW	IW, LW	-	-	-	-

Notes:
1 Dissolved parameter unless otherwise indicated.
2 Primary screening criteria applied are CSR standards for Aquatic Life (AW); Drinking Water (DW), Livestock (LW) and Irrigation (IW).
3 '–' denotes result below primary screening criteria for given constituents.

Monitoring wells CM_MW1-SH and CM_MW1-DP are installed bedrock and the source of chloride, dissolved sodium, barium, and molybdenum is inferred to be naturally occurring and originate from either water interacting with bedrock, or from limited interactions with the atmosphere (SNC-Lavalin, 2017a). Lithium concentrations are naturally high across the Elk Valley.

4.12.3 Discussion

Time-series plots of dissolved selenium and sulphate from the RGMP monitoring locations in Study Area 11 are shown in Appendix VI, Graphs 11-2 and 11-3, respectively. To assess groundwater and surface water interaction dissolved selenium and sulphate concentrations measured in Michel Creek downstream from the confluence with Corbin Creek at surface water location CM_MC2 are also shown on Graphs 11-2 and 11-3. Drawings 661460-339 to -342 show the spatial distribution of CI for samples collected in Study Area 11.

Attenuation of sulphate and dissolved selenium appears to be occurring in the Michel Creek valley bottom farther downgradient of the confluence of Corbin Creek and Michel Creek as no constituent concentrations above screening criteria were noted in CM_MW1-OB (Appendix VI, Graphs 11-2 and 11-3), the location installed in valley-bottom deposits furthest downgradient from CMO. Selenium and sulphate concentrations at the nested well CM_MW1 were below the primary screening criteria. The data for the nested well show higher concentrations of dissolved selenium and sulphate in the shallow overburden well (CM_MW1-OB) compared to the two bedrock monitoring wells (CM_MW1-SH and CM_MW1-DP). This observation is consistent with the CSM identifying the surficial deposits as the main groundwater transport pathway for CI in the Study Area. Concentrations in the shallow overburden well (CM_MW1-OB) fluctuate with no obvious trend. Groundwater conditions in the valley-bottom aquifer downgradient of the CMO loadout are unknown and were identified as a data gap in the 2017 RGMP Update (SNC-Lavalin, 2017a).

4.13 Study Area 12: Elk River Valley Bottom at Study Area Boundary

This area was selected as it is at the boundary of MU 4. Study Area 12 is located downgradient from the confluence of Michel Creek and Elk River. The monitoring points in Study Area 12 are EV_ER1gwS/D and RG_DW-03-04 (also identified as the Sparwood Municipal Well 3). Monitoring wells and relevant surface water locations for Study Area 12 are shown on Drawing 661460-310.

Coarse-grained fluvial and glaciofluvial deposits in Study Area 12 are the primary groundwater-bearing units for domestic and municipal groundwater supplies (Appendix VII). District of Sparwood Wells 1 and 2 and several domestic wells located north of Study Area 12 extract groundwater from a shallow unconfined sand and gravel unit. A deeper semi-confined to confined sand and gravel aquifer is also present in Study Area 12 (e.g., RG_DW-03-4). The confining layer identified as clay at RG_DW-03-04 is not continuous and the deep unit is inferred to interact with the shallow unit and surface water (Michel Creek and/or Elk River). The extent of the deep unit and the confining layer are not well constrained. Groundwater flow direction is expected to be generally parallel or sub parallel to the Elk River; however, at the confluence of Michel Creek and Elk River, groundwater flow is likely governed by the presence of preferential pathways formed by channels of coarser grained sediments. Cross-sections N-N' and O-O' (Drawings 661460-325 and 661460-326) are located approximately parallel and perpendicular to the inferred groundwater flow direction.

4.13.1 Groundwater Levels

Manual and level logger groundwater elevations measured from January 2015 to October 2018 in monitoring wells EV_ER1gwS/D were plotted on a time-series graph (Appendix VI, Graph 12-1) along with pumping data for RG_DW-03-04 and daily water level data recorded for Elk River (hydrometric station 08NK016).

Groundwater elevations at EV_ER1gwS and EV_ER1gwD followed a seasonal trend with annual maximums in 2017 and 2018 approximately 0.4 m higher than 2015 and 2016. The vertical groundwater gradient at the nested well EV_ER1gwS/D was upwards ranging from 0.022 m/m to 0.032 m/m in 2018 (Table 3), which is within range of previously calculated values from 2015 to 2017.

Fluctuations in EV_ER1gwS generally follow the surface water fluctuation observed at the Elk River hydrometric station suggesting a strong hydraulic connection between groundwater and surface water at this location. Note that the amplitude of the fluctuation in groundwater and surface water are not directly comparable as the hydrometric station is located approximately 15 m north of Sparwood. In addition, we note that the elevation of water level measurement at the hydrometric station is unknown; therefore, the water level data shown on Graph 12-1 (Appendix VI) are relative and based on the local datum.

4.13.2 Groundwater Quality

A summary of results above primary screening criteria for Study Area 12 is presented in Table Y.

Table Y: Summary of Constituents above Primary Screening Criteria for Study Area 12

Constituent[1,2,3]	EV_ER1gwS				EV_ER1gwD				RG_DW-03-04			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Selenium	DW	-	DW	DW	DW	-	-	-	-	-	-	DW
Lithium	-	-	-	-	-	-	-	-	DW	DW	DW	DW

Notes:
1 Dissolved parameter unless otherwise indicated.
2 Primary screening criteria applied are CSR standards for Aquatic Life (AW); Drinking Water (DW), Livestock (LW) and Irrigation (IW).
3 '–' denotes result below primary screening criteria for given constituents.

Results from 2018 were similar to previous years with the exception that dissolved lithium concentrations were not detected above the CSR DW standard, although within range of concentrations in previous years. Lithium concentrations are naturally high across the Elk Valley. Concentrations were below secondary screening criteria.

Selenium was the only CI with concentrations above primary screening criteria in Study Area 12. Dissolved selenium concentrations were marginally above the primary screening criteria with concentrations of other CI below applicable primary screening criteria. All concentrations of selenium were below secondary screening criteria.

4.13.3 Discussion

Discussion of chemistry trends in Study Area 12 focused on selenium as this constituent was above primary screening criteria on at least one sampling event at each of the monitoring locations. A time-series plot of dissolved selenium concentrations for groundwater (EV_ER1gwS, EV_ER1gwD and RG_DW-03-04) and surface water stations in the Elk River (EV_ER1) and Michel Creek (EV_MC2) are shown in Appendix VI, Graph 12-2, which also includes the Elk River hydrometric station 08NK016 to assess the effect of freshet on selenium concentrations. Drawings 661460-335 to -338 show the spatial distribution of CI for samples collected in Study Area 12.

Consistent with observations in previous annual reports, a clear seasonal trend in dissolved selenium concentrations was observed in the surface water (Elk River and Michel Creek) and groundwater (EV_ER1gwS/D) due to the effect of dilution in a freshet dominated regime. Selenium concentrations in groundwater at EV_ER1gwS/D in 2018 were lower than concentrations in Michel Creek and Elk River surface water (EV_MC2 and EV_ER1, respectively) as shown on Graph 12-2 (Appendix VI). SNC-Lavalin has previously observed that since 2015, selenium concentrations in Michel Creek have been significantly higher compared to Elk River concentrations and groundwater concentrations in EV_ER1gwS/D. The source of this increase is not clear, but it does not appear to be affecting selenium concentrations in EV_ER1gwS/D. Based on comparison of selenium concentrations between groundwater at EV_ER1gwS/D and surface water in the Elk River, surface water infiltration (recharge) from the Elk River appears to be the main source of selenium in EV_ER1gwS/D.

From 2016 to 2018, groundwater quality in the deeper aquifer at municipal well RG_DW-03-04 (completed at approximately 35 mbgs) appeared to generally reflect the Elk River surface water quality. However, we note that selenium concentrations measured at RG_DW-03-04 were above the concentrations measured in Elk River surface water during the fall of 2015 and 2016 also suggesting an influence of Michel Creek surface water. The 2017 RGMP Update identified a data gap in the Elk River valley bottom upgradient of RG_DW-03-04 where the groundwater flowpath and surface water influence is poorly understood (SNC-Lavalin, 2017a).

The extent of mine-influence groundwater in the Elk River valley-bottom aquifer is unknown; however, because groundwater quality in Study Area 12 appears to reflect the Elk River surface water quality, surface water infiltration (recharge) rather than a valley-bottom groundwater pathway appears to be the source of concentrations above screening criteria measured at this location. Accordingly, groundwater further down the Elk Valley should continue to reflect surface water quality, which is anticipated to improve over time through implementation of the EVWQP.

4.14 Groundwater Surface Water Interactions in Other Management Units

As required in Permit 107517, an assessment of potential surface water to groundwater interaction effects in all management units must be performed. Groundwater-surface water interactions in Study Areas in MUs 1-4 are presented above. Infiltration of the Elk River is interpreted to occur on the local scale downstream of MU 4 based on results from the Drinking Water Sampling Evaluation Program (SNC-Lavalin, 2014). The degree of the influence of surface water infiltration on groundwater in other MUs is variable, dependent on relative levels in the river and groundwater system, river morphology, river gradient, hydraulic properties of the streambed and valley-bottom surficial deposits, distance from river and the degree of pumping from

wells. Teck is currently monitoring a number of domestic water supplies in MU 5 and is undertaking further assessment of water supplies in 2018. The results from this assessment will be considered under the AMP and in future annual reports as appropriate.

4.15 Summary of Results for AMP

A summary of results for MQ6 ("Is water quality being managed to be protective of human health?") is in Table Z. Although the RGMP is listed as an input to MQ1, 2, 3 and 5, it is not currently collecting data that would support these MQs. We anticipate that other programs with groundwater investigation and monitoring currently supporting these MQs will identify data collection requirements that will ultimately become part of the RGMP. For example, groundwater monitoring and geochemical assessment is occuring as part of the Regional Water Quality Model (RWQM) instream sinks program to support MQ1, and groundwater investigation and monitoring for AWTF design at FRO and EVO is occuring to support MQ3. Information from these programs as well as monitoring requirements is anticipated to be incorporated into the RGMP at a future date.

Table Z: Summary of Results Relevant to MQ 6

Topics	Summary for MQ 6
Activities undertaken to answer the MQ / reduce the KU including when (year) and any noteworthy deviations from activities that were planned	Monitoring of groundwater quality at 42 wells in 2018.
Results	Similar results to previous years
Responses to results (actions done or needed) including any adjustments	Continue Monitoring
Future activities planned (year) to answer the MQ/ reduce the KU	Additional groundwater monitoring locations have been installed in Study Areas 1, 4, and 9 in 2018/2019 to address gaps identified in the RGMP.
How will these future activities contribute to answering the MQ/ reducing the KU	Additional characterisation that will inform the RGMP and improve understanding of confirmed/potential transport pathways
What has been learned?	Groundwater conceptual model continues to be valid
Have new KUs arisen from this work?	No

Select KUs that are addressed in the RGMP are listed below:

- KU 6.1. ("Is our understanding of local groundwater conditions for current and future drinking water use sufficient to minimize human exposure to constituents?"); and,
- KU 6.2 ("Is the spatial extent of mine-influenced groundwater sufficiently characterized to manage water quality in order to support meeting the environmental objectives of the EVWQP?").

KU 6.3 ("What are appropriate groundwater related triggers and how can they be used") is currently under development under the AMP and RGMP. Groundwater triggers will be applied through the appropriate monitoring programs once developed. A summary of results related to applicable KUs is provided in Table AA.

More detailed discussions on the activities and learnings associated with evaluating the answer to MQs and reducing KUs will be reported in the Annual AMP Reports.

Table AA: Summary of Results Relevant to KUs 6.1 and 6.2

Topics	Summary for KU 6.1	Summary for KU 6.2
Activities undertaken to reduce the KU (and when), and any noteworthy deviations from activities that were planned	Monitoring of groundwater quality at 41 wells in 2018.	Monitoring of groundwater quality at 41 wells in 2018.
Results	Similar results to previous years. A mine-influenced groundwater transport pathway with groundwater quality not suitable for drinking water use continues to exist in Study Areas 1, 4, and 9. Data gaps relating to the understanding of these locatlized conditions have been identified.	Similar results to previous years, with exceptions. › Increasing concentrations noted at background reference well FR_HMW5; › Cl concentrations above primary and secondary criteria at select locations in the Elk and Fording River Valleys (Study Areas 1 and 4); and,
Results (cont'd)		Spatial understanding of Cl concentrations exceeding primary and secondary screening poorly constrained in the Michel Creek Valley (Study Area 9).
Responses to results (actions done or needed) including any adjustments	Continued monitoring; additional wells drilled in 2018/2019. › Four well nests on the eastern side of the Fording River valley was installed to fill gaps identified in monitoring network relating to the groudnwater transport pathway of in Study Area 1; › Five nested wells drilled in the Elk River Valley were installed to provide information on sources and pathways to valley bottom aquifer in Study Area 4; and, › Nine wells (including five nested) were drilled to delineate Cl extent in Study Area 9 and Sparwood Area.	Continued monitoring in 2019, in addition to proposed future actions. › Consider including newly drilled wells into the RGMP monitoring network; › Continued monitoring in Henretta spoils and downgradient locations as they do not appear to be affected; and, › Replace reference well FR_HMW5 with another reference well or drill a new well for background concentrations at FRO.
Future activities planned (year) to reduce the KU	Groundwater monitoring at newly drilled locations added to RGMP if results suggest it intersects transport pathway and reduces KU.	Spatial understanding pending results from sampling of newly installed wells to assess suitability for characterizing groundwater pathway.
How will these future activities contribute to reducing the KU	Monitoring will inform management of RGMP Study Areas 1, 3, and 4, (where groundwater for drinking water use is considered a potential future receptor) and Study Area 9 where groundwater for drinking water use occurs.	New wells expected to provide additional characterisation of sources and transport pathways of mine-influenced groundwater. Data may be be used to support RWQM.
What has been learned?	Groundwater conceptual model and potential transport pathways supported as previously characterized.	Groundwater conceptual model and potential transport pathways supported as previously characterized.
Have new KUs arisen from this work?	No new KUs identified.	No new KUs identified.

4.16 Quality Assurance/Quality Control (QA/QC) Program

SNC-Lavalin received field and chemistry data from both the SSGMP and RDW as well as relevant data for wells only assessed as part of the RGMP (including both manual and level logger groundwater levels, top of casing information, field measurements and laboratory analytical results, where applicable). SNC-Lavalin has relied on data and information provided by Teck and, as such, has assumed that the information provided is both complete and accurate. Interpretations and conclusions within this report are made with the assumption that data collection was performed in accordance with Permit 107517, the British Columbia Field Sampling Manual (Clark, 2013), and Teck's Standard Practice and Procedures (SP&P).

A QA/QC program specific to the RGMP is not yet in place; however, each Operation conducted a QA/QC program, which is described in site-specific reports. The QA/QC assessment completed for the RGMP included shipping and handling issues, summarized results of relative percent differences (RPDs) from duplicate samples, and any detection of analytes in field blanks for QA/QC samples not already identified in the SSGMP. Results of the QA/QC program are summarized in the following sections, with summaries of SSGMP QA/QC programs including the supplemental wells utilized in the RGMP program, provided in Appendix II.

4.16.1 Shipping and Handling Issues

A summary of shipping and handling issues is provided in Table BB below.

Table BB: Summary of Shipping and Handling Issues

Operation	Well ID	Q	Issue	Rationale
Samples were not received by the laboratory on time				
GHO	GH_MW-ESRC-1	1	The 72-hour hold-time for turbidity, dissolved orthophosphate, nitrate and nitrite was exceeded.	Samples were received six days after sampling and, as a result, the samples had already exceeded their required hold-times.
	GH_POTW09	1	The 72-hour hold-time for turbidity, dissolved orthophosphate, nitrate, and nitrite was exceeded.	Samples were shipped to the Burnaby laboratory and were received three days after sampling. As a result, the laboratory was unable to complete the analysis on time.
Samples were received by the laboratory on time				
GHO	GH_POTW10 and duplicate GH_POTW15 GH_POTW17 GH_GHLRP3 (field blank)	3	Nitrate and nitrite hold-time was exceeded by at least three days prior to analysis.	Laboratory failed to complete analysis within hold time. Due to instrument issues, the laboratory sublet the analysis to the Burnaby Laboratory in August 2018.

All laboratory measured pH and oxidation-reduction potential (ORP) exceeded a hold time of 15 minutes. These measurements are collected in the field provide a reliable measurement. The hold time exceedances are not expected to influence the interpretation of the data; which are discussed in detail where relevant in Section 4 of the report.

Results from 2018 for these parameters were similar to historical results; therefore, exceedances of hold times were not identified as an issue. Furthermore, with the exception of nitrate in select samples, concentrations of these parameters have historically been low in groundwater samples.

4.16.2 Duplicate Samples

Duplicate samples were collected at a frequency of at least one per ten samples during sampling events to assess the precision of the field sampling methodology and consistency of laboratory analysis. Duplicate samples were evaluated by calculation of the RPD of the concentration between the sample and duplicate, as follows:

RPD = (original value - duplicate value)/[(original value + duplicate value)/2] *100

RPDs are calculated for parameters where at least one of the samples was greater than five times the laboratory DL; an RPD of less than 20% for metals and inorganics is considered as an acceptable level of precision as per the BC Field Sampling Manual (Clark, 2013). Teck have a QA/QC program based on this manual; where the result is less than five times the DL, the acceptable RPD will be modified as follows:

- RPD of < 20% = Acceptable;
- RPD of > 20% with results > 5 times the DL = Indicate a possible problem; and
- RPD of > 50% with results > 5 times the DL = Indicates a definite problem, most likely contamination or lack of sample representativeness.

Table CC below summarizes the number of sample duplicates for wells included in the RGMP and any RPDs above acceptable levels (RPD > 50% with results > 5 times the DL).

Table CC: Summary of Duplicate Sample Results above Acceptable Levels

Operation/ Program	Number of Duplicates Included in the RGMP	Summary of RPDs above Acceptable Levels
GHO	6	All RPDs were considered acceptable.
RDW[1]	1	All RPDs were considered acceptable.

[1] Operation/Program refers to the Operation (i.e., FRO, GHO, LCO, EVO, CMO) and/or Program (i.e., Operation SSGMP and RDW) that is responsible for carrying out the monitoring related to each Study Area.

4.16.3 Field Blanks

Teck's standard practice for collecting field blank samples is to open a designated field blank sample bottle pre-filled with ultra-pure de-ionized (DI) water and preservative (where applicable) at the sampling site during regular sample collection. Field blanks provide information on contamination resulting from the handling technique and atmospheric contamination. In 2018, nine field blanks were collected (three in Q1, two in each of Q2, Q3, and Q4); however, limited analytical was obtained at GH_POTW17 (Q4) and GH_MW-ERSC-1 (Q4). Field blanks collected from GH_POTW17 (Q4) and GH_MW-ERSC-1 (Q4) were not analyzed for dissolved metals. A summary of field blank sample results above the DLs is provided in Table DD.

Table DD: Summary of Field Blank Samples with Parameters above Detection Limit

Operation / Program	Associated Well	Quarter	Parameter Above Detection Limit	Value	Detection Limit
GHO	GH_POTW10	Q3	Ammonia as N	108 µg/L	5 µg/L
			Dissolved orthophosphate	0.0011 mg/L	0.0010 mg/L
	GH_POTW17	Q1	Dissolved manganese	0.15 µg/L	0.10 µg/L
		Q4	Turbidity	0.13 NTU	0.10 NTU
			Ammonia as N	16.3 µg/L	5 µg/L
			TKN	0.093 mg/L	0.05 mg/L
			Dissolved orthophosphate	0.0013 mg/L	0.001 mg/L
	GH_MW-ERSC-1	Q1	Dissolved organic carbon (DOC)	1.51 mg/L	0.50 mg/L
		Q2	Turbidity	0.20 NTU	0.10 NTU
		Q4	Ammonia as N	41.5 µg/L	5 µg/L
			TKN	0.135 mg/L	0.05 mg/L
			Nitrite as N	0.0011 mg/L	0.0010 mg/L
			Dissolved orthophosphate	0.001 mg/L	0.0010 mg/L
			Total phosphorus as P	0.0032 mg/L	0.002 mg/L
RDW[1]	RD_DW-03-01	Q3	Ammonia as N	5.9 µg/L	5 µg/L
			DOC	0.58 mg/L	0.50 mg/L
	RG_DW-02-20	Q1	Turbidity	0.12 NTU	0.10 NTU

Notes:
[1] Operation/Program refers to the Operation (i.e., FRO, GHO, LCO, EVO, CMO) and/or Program (i.e., Operation SSGMP and RDW) that is responsible for carrying out the monitoring related to each Study Area.
BOLD – Parameter concentration is greater than five times the analytical detection limit.

Eight of the nine field blanks contained detectable parameters in 2018; however, only two of these wells (GH_POTW10 in Q3 and GH_MW-ERSC-1 in Q4) contained concentrations of ammonia as N greater than five times the associated DL (i.e., the reliable detection limit). Overall, detectable concentrations of ammonia were also greater than measured values in groundwater at the corresponding sampling locations. Similar detections were measured in unopened trip blanks (see sub-section below) and in some instances where concentrations were greater than measured values in groundwater at the corresponding sampling locations. In addition, similar detectable parameters in field and trip blanks from groundwater monitoring were reported in 2017. SNC-Lavalin contacted the laboratory to determine the source(s) of parameters above the DLs. Although the field blanks could not be re-analyzed due to hold-time exceedances, the laboratory provided the results of ultra-pure DI water for select months in 2018; however, concentrations of these parameters were not detected. The laboratory investigated possible sources of parameters above DLs including review of the quality control and method blanks from the specific analysis batches, source material used for

preservatives, and previous instances of confirmed contamination of sample containers. Based on the laboratory investigation, concentrations of parameters above the DL in field blanks were not sourced from the laboratory. There is a possibility that the detectable concentrations of select parameters are due to low level introduction of these parameters in the field or in shipping and handling. It is noted that all concentrations measured in field blanks are below the lowest applicable groundwater standard and the detectable concentrations of parameters are not considered to be a concern for data reliability.

4.16.4 Trip Blanks

Standard practice for trip blanks consists of ordering bottles with ultra-pure DI water and preservative (where applicable) from the lab, which are kept in a dedicated cooler and are unopened throughout the sampling event. Trip blanks are meant to detect widespread contamination from the container and preservative during transport and storage. Trip blanks accompany each sampling event and the analytical results of the trip blanks are assessed for possible contamination. In 2018, one trip blank was collected in association with RGMP wells not sampled as part of any SSGMPs. All parameters on the RGMP analyte list were analyzed in the trip blank, with the exception of dissolved metals and DOC.

The detectable concentrations in trip blanks are similar to the results for the field blanks, ammonia as N and dissolved manganese higher than concentrations in the field blanks or groundwater samples collected at the corresponding locations. As indicated in the previous sub-section, the laboratory investigations did not identify the source(s) of parameters measured above the DLs from the laboratory. Overall, the detectable concentrations of parameters are not considered to affect the reliability of the data.

4.16.5 Laboratory QA/QC

The detailed results of laboratory QA/QC are included in Certificates of Analysis in Appendix V. The Quality Control Reports noted the following for some samples.

- Matrix Spike recovery could not be accurately calculated for some constituents due to high analyte background in sample.
- DLs were raised due to dilution required due to high concentration of test analyte(s), analyte was detected at a comparable level in the method blank, high dissolved solids/electrical conductivity, or sample matrix effects (e.g., chemical interference, colour, turbidity).
- TKN results were likely biased low due to nitrate interference. Nitrate-N is > 10x TKN.
- Method blank exceeded ALS Laboratory (ALS) data quality objectives (DQO). Limits of reporting were adjusted for samples with positive hits below 5x blank level.
- DLs were adjusted for required dilution.
- Reported result was verified by repeat analysis.
- Reported highest result: sample is not homogeneous.
- Lab control sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, it reported, have been qualified.
- Hardness was calculated from total calcium and/or magnesium concentrations and may be biased high (dissolved calcium/magnesium results unavailable).
- Dissolved concentrations exceeds total. Results were confirmed by re-analysis.

- Hold-time was exceeded for re-analysis or dilution, but the initial testing was conducted within the hold time.
- DQO was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan/Multi-Parameter Scan (considered acceptable as per Canadian Council of Ministers of the Environment [CCME]).

These notes are not unusual for these analyses and the results of the laboratory QA/QC were considered to be acceptable for the purpose of this assessment.

In addition to the results above, ALS reported that the dissolved concentration of cadmium from GH_POTW15 (Q1) exceeded total concentrations for the field-filtered sample. This suggests metallic contaminants may have been introduced to dissolved sample during field filtration for this sample. The qualifier suggests that concentrations of these parameters are interpreted to be biased high. This concentration was one magnitude lower than the applicable criteria and are considered acceptable for reporting purposes.

No vial for dissolved mercury analysis was submitted for CM_MW1-OB (Q4) and water from the routine bottle was filtered and preserved in the laboratory in order to measure mercury. The laboratory also indicated that groundwater from GH_POTW09 was also lab filtered and/or preserved for the analysis of DOC and TOC.

The Certificate of Analyses (COA) for samples from GH_POTW17 (Q3), indicate that this sample was filtered and preserved for dissolved metals and DOC in the laboratory approximately five days after sampling, which is within the required holds times for laboratory filtering (within six to ten days of sampling) and preservation (within 14 days of sampling). Due to the potential of precipitation, a potential does exist that concentrations of dissolved metals are biased low; therefore, it is best practice to filter and preserve samples in the field. It is noted that concentrations of dissolved metals and DOC in these samples were consistent with historical results and as such this practice did not affect the interpretation.

A review of the QA portion of the laboratory analytical reports did not identify any additional QA/QC issues.

4.16.6 QA/QC Summary

QA/QC data relating to the RGMP were considered acceptable. A summary of the QA/QC results is as follows.

- Hold time exceedances, RPDs above acceptable levels and samples that samples that were lab filtered are not expected to influence interpretation of results.
- Detectable concentrations were measured in field blank samples but were not considered to affect the reliability of results.
- Metallic contaminants potentially introduced into the dissolved sample at GH_POTW15 in Q1 (GHO) may have biased the concentrations for dissolved cadmium high. This is not considered to affect the reliability of the result, as the concentration remained one magnitude less than the applicable criteria. Several parameters (including dissolved metals suite) were not analyzed for in field and trip blanks at GHO and as part of the RDW program.
- Trip blanks were not collected during any of the quarters in 2018 at GHO.

SNC-Lavalin recommends adding trip blanks to GHO sampling programs and continuing to use trip and field blanks at FRO, LCO and EVO. All analytes listed required in the RGMP should be analyzed for in trip and field blanks so that results can be monitored for the possibility of introduction of parameters in the field.

5 Conclusions and Recommendations

In general, groundwater conditions and interpretations in 2018 were consistent with those outlined in past reports. Concentrations of Cl above primary and secondary screening criteria were generally consistent with previous measurements and are summarized by Study Area below. The 2017 RGMP Update considered data gaps and additional studies recommended to fill the data gaps; the text below references these gaps where applicable and provides further recommendations as necessary.

Recommendations for the RGMP are as follows.

- Once approved, implement the 2017 RGMP Update;
- Complete hydraulic conductivity testing at monitoring wells which have not been previously tested (GH_MW-RLP-1D);
- Monitor pumping rates and water levels in supply wells GH_POTW09, GH_POTW10, GH_POTW15, and GH_POTW17 at GHO upon completion of an assessment of the feasibility of installing dataloggers;
- Monitoring wells at CMO are currently surveyed to top of steel casing. A re-survey of the wells to top of PVC pipe casing should be completed;
- If concentrations of Cl at EV_RCgw remain elevated, additional investigations may be required to determine the possible source and spatial extent of the elevated Cl; and
- Continue to monitor increases in sulphate and dissolved selenium in reference well FR_HMW5 until a replacement well is established. A review of the reference well monitoring network will be conducted in 2019 as part of the groundwater trigger work for the Adaptive Management Plan (AMP). Teck plan to replace this well in 2020 after the next budget cycle; an appropriate location for the replacement will assessed after holistic review of the reference network.

Monitoring and Sampling Procedures

- When possible, collect samples at least 60 days after the last sampling event (i.e., June of Q2 and August of Q3);
- For nested wells, monitor wells on the same day, one right after the other, and collect manual depth to groundwater measurements prior to purging either well rather than purging and sampling one well and then moving to the well pair;
- Implement the new data logger deployment procedures to ensure that continuous water level measurements are properly obtained from select monitoring wells;
- Ensure all parameters stabilize before sampling and avoid sampling if bubbles are present in tubing;
- Review sampling procedures to minimize potential contamination when collecting samples and handling field blanks;
- Field filter and preserve groundwater samples for analysis of dissolved metals and DOC;
- Ensure that one trip blank is included for each sampling event; and
- Attempt to collect field and trip blanks from locations associated with both the RGMP and other associated programs (e.g., SSGMP and/or RDW).

Sample Submission, Analysis, and QA/QC

- Analyze all samples (including duplicates, trip and field blanks) for parameters listed in the 2017 RGMP Update once approved;

- Continue discussions with the laboratory on the best procedures to minimize hold-time exceedances; and
- Complete a QA/QC on laboratory results as they come in to identify hold-time and other errors that may arise to rectify in the subsequent sampling event.

5.1 Background (Reference) Conditions

Four background wells were discussed, one as part of the RGMP (FR_HMW5) and three additional wells (GH_GA-MW-1 and CM_MW3-SH/DP). Groundwater results for Cl for each of the background wells were below the primary screening criteria for each quarter in 2018. Select non-Cl, other than lithium, were greater than primary screening criteria in CM-MW3-DP and GH_GA-MW-1, but are not considered a concern. Lithium, measured in each of the background wells, is interpreted to be naturally occurring. Monitoring well FR_HMW5 exhibited increasing trends in Cl, but should continue to be monitored until a replacement reference well is installed. Well GH_GA-MW-1 is not considered suitable due to its low permeability and a reference well should be selected from the new wells installed to the north and upgradient of this location.

5.2 Study Area 1

Monitoring wells FR_09-01-A/B and FR_GH_WELL4 capture a preferential pathway for transport of Cl from Kilmarnock Creek through the alluvial fan along the eastern side of the Fording River valley bottom. Discharge and mixing with Fording River surface water likely occurs between FR_09-01-A/B and FR_GH_WELL4 and the nearest downgradient monitoring points at GHO; however, these monitoring points are over 15 km downstream and the localized extents of Cl in groundwater are not well constrained. The spatial extent of the coarse-grained aquifer intercepted at the Greenhouse Wells, as well as the spatial extent of the down-valley groundwater transport of Cl, were identified as data gaps in the 2017 RGMP Update (SNC-Lavalin, 2017a). These gaps are likely to be addressed by new monitoring well installations in 2018 as part of other programs; however, conclusions of these investigations are pending, and this will be evaluated in the next annual reporting cycle.

Monitoring well GH_MW-PC, in the vicinity of Porter Creek, was added to Study Area 1 in 2018 based on recommendations from the ENV. This well is farthest downgradient but on the western portion of the valley and had dissolved selenium concentrations greater than the applicable standards. Porter Creek surface water is interpreted to be the main transport pathway for loading of Cl to groundwater in the drainage.

5.3 Study Area 2

Groundwater quality in LC_PIZDC1308 and LC_PIZDC1307 has historically been consistently below primary screening criteria for the Cl. There are no groundwater monitoring wells in the valley bottom; however, potential pathways for Cl to groundwater in the valley bottom within Study Area 2 are being monitored by wells upgradient in the Dry Creek drainage and in surface water at monitoring stations in Dry Creek and the Fording River. There are no continuous aquifers in the Dry creek drainage; therefore, the only transport pathway identified to groundwater in Study Area 2 is the surface water pathway as groundwater transport through the till is negligible. The effects of Dry Creek mine influence on groundwater in the alluvial fan is expected to be relatively lower than the infiltration of surface water from Fording River.

5.4 Study Area 3

Surface water infiltration appears to affect GH_POTW17 and may have influenced GH_POTW09 in Q3 2018. However, silt and clay units at surface in the Fording River valley bottom in Study Area 3 generally provide a hydraulic barrier minimizing downward transport of mine-influenced water into the aquifer with water supply wells. Concentrations of Cl in surface water are significantly higher than groundwater indicating surface water is the main pathway for mine-influenced water and not groundwater.

5.5 Study Area 4

Groundwater selenium concentrations in Study Area 4 have shown considerable variability (i.e., orders-of-magnitude) and the local-scale interaction with surface water and groundwater discharge is not well understood. It is suspected that variable groundwater Cl concentrations are due to variability in Cl concentrations in surface water from nearby tributaries. Mining influence on groundwater is interpreted to be on the local scale proximal to the infiltration ponds at the base of the valley flanks adjacent to GHO. Groundwater concentrations of Cl were below screening criteria at the supply well RG_DW-01-03, with concentrations decreasing farther downgradient of Elkford at domestic well location RG_DW-01-07, indicating a regional down-valley pathway does not exist.

Groundwater quality results from the Elk River Valley in 2018 were either above or approaching the primary and secondary screening criteria for dissolved selenium at GH_GA-MW-2 (Wolfram Creek), GH_GA-MW-3 (Thompson Creek), and GH_MW-ERSC-1 (Downgradient of Thompson Creek) in Q1 and/or Q2. A concentration of nitrate nitrogen above the primary screening criteria was also measured in Q1 at monitoring well GH_GA-MW-2. Concentrations of Cl in tributary surface water from Wolfram and Thompson Creeks have historically been greater than concentrations in groundwater, suggesting that surface water is the primary pathway for transport of Cl to the Elk River valley bottom. At location GH_MW-ERSC-1, concentrations of Cl were greater than at upgradient wells during winter months indicative of either intermittent infiltration from surface water in the side channel or the presence of another source of mine-influenced water exists. The GHO SSGMP did not identify any source in the vicinity and there are no immediate upgradient tributary drainages; however, the well is situated 45 m from the Elk River side channel and infiltration may be influencing the groundwater quality in this well. Groundwater-surface water interactions are currently being studied under a LAEMP.

Concentrations of Cl at GH_GA-MW-4 (Leask Creek) were lower than historically measured, indicative that groundwater in this area is influenced by infiltration from the Elk River, whereas it has historically exhibited relatively a similar major ion distribution to surface water from Leask Creek. In 2018, Cl concentrations and mine-influence in groundwater at this location appears to be variable due to variable mixing of infiltrating surface water from Leask Creek as well as from the Elk River.

5.6 Study Areas 5 and 6

The existing monitoring network does not appear to be mine-influenced. There are no data for the Elk River valley-bottom aquifer downgradient of identified sources near the Process Plant and the 2017 RGMP Update identified that as a data gap with recommendation for additional wells to be installed. However, it is worth noting that groundwater farther down the Elk River valley monitored in Study Area 7 is reflective of surface water quality, indicating a down-valley groundwater transport pathway does not exist at the regional scale.

5.7 Study Area 7

Groundwater transport of CI from the Harmer Creek drainage to the Elk River valley bottom is inferred to be minimal based on relatively low groundwater concentrations measured in Harmer Creek drainage at EV_GV3gw compared to surface water. Groundwater quality in the Elk River valley bottom is influenced by Elk River surface water quality and dissolved selenium concentrations were measured above CSR DW in RG_DW-02-20 in Q1 and Q2. Teck is currently supplying alternate drinking water to the owners of this well. Because the main pathway for CI above criteria in groundwater in the Elk River valley bottom is surface water infiltration (i.e., surface water pathway), monitoring of RG_DW-02-20, was considered to be sufficient for Study Area 7 in the 2017 RGMP Update (SNC-Lavalin, 2017a).

5.8 Study Area 8

Groundwater in Study Area 8 does not contain elevated concentrations of CI at the monitoring wells EV_LSgw and EV_OCgw which monitor potential inputs from upland, tributary valley bottom, and Elk River valley bottom features along the western slope of EVO. Loading of mine-influenced constituents to groundwater valley bottom in Study Area 8 is therefore inferred to be primarily from infiltration of surface water associated with drainages and mining features along the western slope of EVO and surface water recharge from nearby Elk River. Surface water from Goddard Creek (EV_GC2) is interpreted to lose to ground near Goddard Settling Ponds and Goddard Marsh, and may influence groundwater quality in this area which was identified as a data gap in the 2017 RGMP Update (SNC-Lavalin, 2017a). There may be existing wells in this area that may fill this gap; the existence and condition of these wells will be evaluated in 2019. With the exception of Goddard Creek, there does not appear to be a confirmed groundwater transport pathway between the surface water sources identified on the western slope of EVO and Elk River valley bottom (SNC-Lavalin, 2017a).

5.9 Study Area 9

A down-valley groundwater pathway was identified where concentrations of CI in groundwater in the Michel Creek valley bottom were above the surface water concentrations and secondary screening criteria. The 2017 RGMP Update identified gaps in groundwater data for the Michel Creek valley-bottom aquifer downgradient of Baldy Ridge where several creeks infiltrate to ground, as well as delineation of the spatial extent of the mine-influenced aquifer with CI concentrations above primary screening criteria (SNC-Lavalin, 2017a). Preliminary results from additional monitoring wells installed downgradient of the highest recorded concentration of CI (EV_RCgw) indicate a likely down-valley pathway for groundwater transport of CI is present in both deep and shallow wells installed within the sand and gravel materials overlying bedrock. However, preliminary results suggest attenuation along the flowpath limits the extent of high CI concentrations. In addition, groundwater at the base of Baldy Ridge does not appear to be affected by the surface water infiltration of creeks in this area. Comprehensive analysis and results from these wells will be presented in a separate report to address the data gaps identified in the 2017 RGMP Update (SNC-Lavalin, 2017a). If concentrations of CI at EV_RCgw remain elevated, additional investigations may be required to determine the possible source and spatial extent of the elevated CI.

5.10 Study Area 10

Groundwater quality in EV_ECgw was below all primary screening criteria for the CI in 2018; therefore, groundwater transport of CI in the Erickson drainage appears to be negligible. Data do not exist for the Michel

Creek valley-bottom aquifer downgradient of Erickson Creek and the South Pit Decant Pond and as such groundwater quality is unknown and was identified as a data gap in the 2017 RGMP Update (SNC-Lavalin, 2017a). Installation of a monitoring well in this Study Area would fill this gap; however, the Study Area was given a lower priority in the 2017 RGMP Update. It is noted that mine-influence on groundwater is likely to be the result of infiltration of impacted surface water rather than upland/tributary groundwater transport. The nearest monitoring points are approximately 6 km down the valley (Study Area 9) and because they are elevated in Cl from assumed local sources they do not provide any indication of groundwater quality down-valley from Study Area 10.

5.11 Study Area 11

The farthest downgradient groundwater monitoring location in the Michel Creek valley bottom in Study Area 11 (CM_MW1-OB/SH/DP) reported concentrations of Cl below primary screening criteria. The data for the nested well show higher concentrations of dissolved selenium and sulphate in the shallow overburden well compared to the two bedrock monitoring wells, consistent with the CSM identifying the surficial deposits as the main groundwater transport pathway for Cl in the Study Area. Groundwater conditions in the valley-bottom aquifer downgradient of the CMO loadout are unknown and were identified as a data gap in the 2017 RGMP Update (SNC-Lavalin, 2017a). The CMO 2018 SSGMP Update also identified gaps in understanding relating to seepage associated with the Main Interceptor Sedimentation Ponds and downgradient of the Middle Mountain CCR pile, along Corbin Creek (SRK, 2018). Additional monitoring wells have been recommended to fill these gaps. Once installed, the wells should be assessed for suitability for inclusion in the RGMP and confirm whether the new wells will also fill the gap identified in the 2017 RGMP Update. If the wells are not suitable, installation of an additional well installed in the unconsolidated aquifer near the downgradient boundary of Study Area 11 is recommended to monitor a potential groundwater pathway in the valley-bottom sediments.

5.12 Study Area 12

Groundwater quality in Study Area 12 appears to reflect Elk River and/or Michel Creek surface water quality and groundwater concentrations are generally lower than surface water concentrations. Surface water infiltration (recharge) rather than a valley-bottom groundwater pathway appears to be the cause of concentrations above screening criteria measured at this location; however, there is potential for a down-valley groundwater flow pathway from Study Area 9 also affecting groundwater quality in Study Area 12. No data exist for the Elk River and Michel valley-bottom upgradient aquifers of RG_DW-03-04. Although a surface water connection is apparent, the absence of groundwater elevation and groundwater quality data does not allow for a detailed understanding of the groundwater flowpath and surface water influence was considered a gap in the 2017 RGMP Update (SNC-Lavalin, 2017a). This gap will be re-evaluated after the results from the drilling and monitoring well installation in the Sparwood Area and Study Area 9 become available.

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Tables

TABLE 1: Summary of Applicable Primary and Secondary Screening Criteria

Study Area	Well ID	Operation / Program[1]	MU	Primary Screening				Secondary Screening (Selenium Only)		
				AW Criteria Applied[5]	DW Criteria Applied	IW Criteria Applied	LW Criteria Applied	Site Performance Objective	Compliance Point	DW Guidelines Applied
Background	FR_HMW5	FRO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	FR_FRCP1 (E300071)	CDWQG
	CM_MW3-SH[2]	CMO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	CM_MC2 (E258937)	CDWQG
	CM_MW3-DP[2]	CMO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	CM_MC2 (E258937)	CDWQG
	GH_GA-MW-1	GHO	3	BC CSR	BC CSR	BC CSR	BC CSR	GH_ER1 (E206661)	GH_ERC (E300090)	CDWQG
1	FR_09-01-A	FRO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	FR_FRCP1 (E300071)	CDWQG
	FR_09-01-B	FRO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	FR_FRCP1 (E300071)	CDWQG
	FR_GH_WELL4[3]	FRO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	FR_FRCP1 (E300071)	CDWQG
	GH_MW-PC[2]	GHO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	FR_FRCP1 (E300071)	CDWQG
2	LC_PIZDC1308	LCO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	GH_FR1 (200378)	CDWQG
	LC_PIZDC1307	LCO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	GH_FR1 (200378)	CDWQG
3	GH_POTW09	GHO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	GH_FR1 (200378)	CDWQG
	GH_POTW10	GHO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	GH_FR1 (200378)	CDWQG
	GH_POTW15	GHO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	GH_FR1 (200378)	CDWQG
	GH_POTW17	GHO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	GH_FR1 (200378)	CDWQG
	GH_MW-RLP-1D[2]	GHO	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	GH_FR1 (200378)	CDWQG
4	GH_MW-ERSC-1	GHO	3	BC CSR	BC CSR	BC CSR	BC CSR	GH_ER1 (E206661)	GH_ERC (E300090)	CDWQG
	GH_GA-MW-2	GHO	3	BC CSR	BC CSR	BC CSR	BC CSR	GH_ER1 (E206661)	GH_ERC (E300090)	CDWQG
	GH_GA-MW-3	GHO	3	BC CSR	BC CSR	BC CSR	BC CSR	GH_ER1 (E206661)	GH_ERC (E300090)	CDWQG
	GH_GA-MW-4	GHO	3	BC CSR	BC CSR	BC CSR	BC CSR	GH_ER1 (E206661)	GH_ERC (E300090)	CDWQG
	RG_DW-01-03	RDW	3	BC CSR	BC CSR	BC CSR	BC CSR	GH_ER1 (E206661)	-	CDWQG
	RG_DW-01-07	RDW	3	BC CSR	BC CSR	BC CSR	BC CSR	GH_ER1 (E206661)	-	CDWQG
5/6	LC_PIZP1101	LCO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER4 (0200027)	-	CDWQG
7	EV_GV3gw	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	CDWQG
	RG_DW-02-20	RDW	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	CDWQG
8	EV_LSgw	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	CDWQG
	EV_OCgw	EVO	4	BCWQG	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	CDWQG
9	EV_BCgw	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	EV_MC2 (E300091)	CDWQG
	EV_MCgwS	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	EV_MC2 (E300091)	CDWQG
	EV_MCgwD	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	EV_MC2 (E300091)	CDWQG
	EV_BRgw	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	EV_MC2 (E300091)	CDWQG
	EV_RCgw	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	EV_MC2 (E300091)	CDWQG
	EV_WH50gw	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	EV_MC2 (E300091)	CDWQG
	EV_HW1[2,4]	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	EV_MC2 (E300091)	CDWQG
	RG_DW-03-01	RDW	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	CDWQG
10	EV_ECgw	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	EV_MC2 (E300091)	CDWQG
11	CM_MW1-OB	CMO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	CM_MC2 (E258937)	CDWQG
	CM_MW1-SH	CMO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	CM_MC2 (E258937)	CDWQG
	CM_MW1-DP	CMO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	CM_MC2 (E258937)	CDWQG
12	EV_ER1gwS	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	CDWQG
	EV_ER1gwD	EVO	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	CDWQG
	RG_DW-03-04	RDW	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	CDWQG

[1] Operation/Program refers to the Operation (.e., FRO, GHO, LCO, EVO, CMO) and/or Program (i.e., Operation SSGMP and RDW) that is responsible for carrying out the monitoring related to each Study Area.

[2] Included in the RGMP program based on ENV's recommendation upon review of the 2017 RGMP Update.

[3] Prior to Q4 2017 greenhouse water supply wells, which include four wells (FR_GH_WELL1, FR_GH_WELL2, FR_GH_WELL3 and FR_GH_WELL4), were variably sampled. Beginning in Q4 2017 only FR_GH_WELL4 is sampled.

[4] EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.

[5] BCWQG applied for wells located within 10 m from a receiving surface water body.

MU denotes Management Unit.

FRO, GHO, LCO, EVO, and CMO denotes Fording River Operations, Greenhills Oprtations, Line Creek Operations, Elkview Operations, and Coal Mountain Operations, respectively.

RDW denotes Regional Drinking Water Program.

BC CSR denotes BC Contaminated Sites Regulation.

BCWQG denotes BC Water Quality Guideline.

CDWQG denotes Canadian Drinking Water Quality Guideline.

AW, DW, IW, LW denotes Aquatic Life, Drinking Water, Irrigation Watering, and Livestock Watering, respectively.

TABLE 2: Well Installation Details and Hydrogeological Information

Study Area	Well ID	Type	Operation / Program[1]	MU	Easting (m)	Northing (m)	LIDAR Ground Elevation (masl)	Ground Elevation (masl)	TOC Elevation (masl)	Drilled Depth (mbgs)	Screened Depth (mbgs)	Screened Formation	Depth to Bedrock (mbgs)	Hydrostratigraphic Unit	Hydraulic Conductivity[5] (m/s)
Background	FR_HMW5	Monitoring	FRO	1	655476	5567514	1793.23	1785.2	1786.03	12.6	7.3 - 10.4	Gravel	10.7	Fluvial sediments in valley bottom	3.00E-03
	CM_MW3-SH[2]	Monitoring	CMO	4	668237	5482854	1571.76	1573.4	1574.14[6]	6.62	4.0 - 6.62	Clay and Gravel	6.6	Fluvial sediments above the bedrock contact	1.00E-07
	CM_MW3-DP[2]	Monitoring	CMO	4	668237	5482854	1571.76	1573.4	1574.14[6]	27.4	13.1 - 16.27	Bedrock	6.6	Siltstone	3.90E-04
	GH_GA-MW-1	Monitoring	GHO	3	648019	5554750	1378.81	1379.21	1380.26	22.6	15.5 - 18.5	Clayey Sand	22.6	Interlayered alluvial and lacustrine sediments	1.00E-12
1	FR_09-01-A	Monitoring	FRO	1	652601	5558300	1584.64	1584.10	1584.95	8.4	3.83 - 6.88	Sandy Gravel	-	Fluvial sediments in valley bottom	1.00E-03
	FR_09-01-B	Monitoring	FRO	1	652601	5558300	1584.64	1584.10	1584.86	29.0	17.15 - 18.67	Gravel	-	Fluvial sediments in valley bottom	1.50E-04
	FR_GH_WELL4[3]	Supply	FRO	1	653150	5557337	1576.45	1575.80	-	Well 1: 21.6 Well 2: 16.8 Well 3: 11.6 Well 4: 29.0	Well 1: 20.4 - 21.6 Well 2: 10.7 - 16.8 Well 3: 10.4 - 11.6 Well 4: 25.9 - 29.0	Well 1: Gravel Well 2: Gravel Well 3: Gravel Well 4: Sand and Gravel	-	Fluvial sediments in valley bottom	-
	GH_MW-PC[2]	Monitoring	GHO	1	653526	5555339	1573.37	1583.50	1582.28	45.0	3.50 - 6.50	Gravel and Cobbles	5.5	Fluvial sediments above the bedrock contact	6.33E-07
2	LC_PIZDC1308	Monitoring	LCO	1	658111	5541267	1721.68	1690.42	1691.37	19.81	6.10 - 9.14	Silty Gravel	-	Colluvium and till	1.00E-07
	LC_PIZDC1307	Monitoring	LCO	1	658111	5541267	1721.68	1690.50	1691.21	35.05	32.77 - 34.75	Silt some Sand	-	Highly consolidated basal till	7.00E-07
3	GH_POTW09	Supply	GHO	1	654208	5545404	1495.28	-	-	37	26.8 - 36.3	Silty Gravel	36.08	Fluvial sediments above the bedrock contact	-
	GH_POTW10	Supply	GHO	1	653291	5545484	1488.94	-	-	53.6	-	Gravel	-	Glaciofluvial sediments	-
	GH_POTW15	Supply	GHO	1	653169	5545667	1489.67	-	-	43.9	-	Gravel and Cobbles	-	Glaciofluvial sediments	-
	GH_POTW17	Supply	GHO	1	653698	5545811	1505.18	1504.00	-	47.2	39.3 - 42.4	Sand and Gravel	-	Fluvial sediments underlying lacustrine sediments	1.30E-04
	GH_MW-RLP-1D[2]	Monitoring	GHO	1	654088	5545381	1494.78	1495.00	-	83.5	79.5 - 82.5	Sand and Gravel	-	Glaciofluvial sediments	-
4	GH_MW-ERSC-1	Monitoring	GHO	3	649081	5548704	1286.45	1283.36	1284.11	7.92	4.12 - 7.17	Sand and Gravel/ Bedrock	6.1	Till/ Bedrock interface	3.00E-06
	GH_GA-MW-2	Monitoring	GHO	3	648291	5552115	1305.23	1306.66	1307.68	29.6	23 - 28	Sand/Silt	28.5	Fluvial sediments above the bedrock contact	1.00E-03
	GH_GA-MW-3	Monitoring	GHO	3	648578	5550296	1299.62	1299.78	1300.75	14.4	8 - 14	Sand and Gravel	14.4	Fluvial sediments above the bedrock contact	2.00E-06
	GH_GA-MW-4	Monitoring	GHO	3	648217	5552963	1311.57	1312.15	1313.05	17.2	13.7 - 16.7	Sand and Gravel	-	Alluvial sediments	1.00E-04
	RG_DW-01-03	Supply	RDW	3	649089	5543336	1262.49	-	-	27.96	-	Sand and Gravel	-	Interlayered Fluvial Sediments	-
	RG_DW-01-07	Domestic	RDW	3	649737	5534118	1244.76	-	-	9.8	-	Sandy Gravel	-	-	-
5/6	LC_PIZP1101	Monitoring	LCO	4	653960	5528263	1266.65	1266.00	1267.06	41.2	37.5 - 40.5	Sand and Gravel	-	Fluvial sediments	7.40E-04
7	EV_GV3gw	Monitoring	EVO	4	656580	5522255	1307.01	1307.05	1307.96	25	22.85 - 24.38	Silty Gravel	-	Alluvial sediments in valley bottom	-
	RG_DW-02-20	Domestic	RDW	4	652327	5522263	1169.15	-	-	18.3	-	-	-	-	-
8	EV_LSgw	Monitoring	EVO	4	653274	5514731	1133.05	1133.00	1133.93	10.67	5.18 - 6.71	Sand and Gravel	-	Fluvial sediments in valley bottom	1.00E-03
	EV_OCgw	Monitoring	EVO	4	652480	5512671	1125.48	1126.00	1126.89	15.54	11.58 - 14.63	Sand	14.48	Fluvial sediments above the bedrock contact	7.00E-07
9	EV_BCgw	Monitoring	EVO	4	655381	5509659	1153.15	1153.00	1153.86	23.16	17.77 - 20.82	Gravel	-	Fluvial sediments in valley bottom	1.00E-04
	EV_MCgwS	Monitoring	EVO	4	653476	5511624	1131.04	1131.00	1131.96	10.67	5.79 - 7.32	Clayey Silt	-	Shallowest fluvial aquifer	7.00E-08
	EV_MCgwD	Monitoring	EVO	4	653476	5511624	1131.04	1131.00	1131.84	47.55	24.50 - 27.55	Sand and Clay	-	Deepest fluvial aquifer	3.00E-06
	EV_BRgw	Supply	EVO	4	654961	5510221	1149.34	-	-	-	-	-	-	Fluvial sediments in valley bottom	-
	EV_RCgw	Supply	EVO	4	655902	5509299	1162.02	-	-	-	-	Sand and Gravel	-	Fluvial sediments in valley bottom	-
	EV_WH50gw	Supply	EVO	4	655705	5509196	1159.14	-	-	-	-	-	-	Fluvial sediments in valley bottom	-
	EV_HW1[2,4]	Supply	EVO	4	654774	5510579	1145.22	-	-	6.1	-	-	-	Fluvial sediments in valley bottom	-
	RG_DW-03-01	Domestic	RDW	4	653073	5511979	1127.54	-	-	15.24	14.0 - 15.2	Gravel	-	-	-
10	EV_ECgw	Monitoring	EVO	4	660795	5506384	1327.17	1327.00	1327.74	10.97	2.59 - 4.12	Sand/Clay and Sand	-	Colluvium overlying till	1.00E-08
11	CM_MW1-OB	Monitoring	CMO	4	667957	5487526	1494.47	1500.44	1501.20[6]	37.19	2.87 - 4.39	Gravel and Silt	-	Fluvial sediments in valley bottom	1.20E-04
	CM_MW1-SH	Monitoring	CMO	4	667957	5487526	1494.47	1500.44	1501.19[6]	37.19	20.44 - 23.49	Bedrock	18.0	Siltstone	2.00E-07
	CM_MW1-DP	Monitoring	CMO	4	667957	5487526	1494.47	1500.44	1501.75[6]	37.19	34.22 - 37.19	Bedrock	18.0	Siltstone	6.00E-06
12	EV_ER1gwS	Monitoring	EVO	4	651374	5510955	1114.41	1115.25	1115.96	17.61	14.56 - 17.61	Sand and Gravel	-	Shallowest fluvial aquifer	-
	EV_ER1gwD	Monitoring	EVO	4	651379	5510952	1114.35	1115.2	1115.91	30.78	25.82 - 28.87	Sand/Silty Sand	27.89	Deepest fluvial aquifer	9.00E-04
	RG_DW-03-04	Supply	RDW	4	651839	5510619	1113.23	-	-	32.4	24.2 - 32.4	Sandy Gravel	-	Fluvial sediments in valley bottom	-

[1] Operation/Program refers to the Operation (.e., FRO, GHO, LCO, EVO, CMO) and/or Program (i.e., Operation SSGMP and RDW) that is responsible for carrying out the monitoring related to each Study Area.
[2] Supplemental groundwater monitoring locations.
[3] Prior to Q4 2017 greenhouse water supply wells, which include four wells (FR_GH_WELL1, FR_GH_WELL2, FR_GH_WELL3 and FR_GH_WELL4), were variably sampled. Beginning in Q4 2017 only FR_GH_WELL4 is sampled.
[4] EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.
[5] Average hydraulic conductivity.
[6] TOC elevation was surveyed from the steel casing and water level measurements prior to Q4 2018 were collected from the top of steel casing. Q4 and future measurements will be collected from the top of pipe casing. TOC elevation has been corrected to reflect estimated top of pipe casing.
"-" denotes data not available.
MU denotes Management Unit.
TOC denotes top of casing.
masl denotes meters above sea level.
mbgs denotes meters below ground surface.
FRO, GHO, LCO, EVO, and CMO denotes Fording River Operations, Greenhills Oprtations, Line Creek Operations, Elkview Operations, and Coal Mountain Operations, respectively.
RDW denotes Regional Drinking Water Program.

TABLE 3: Groundwater Monitoring Results and Calculated Vertical Gradients

Study Area	Well ID	Operation / Program[1]	LIDAR Ground Elevation (masl)	Ground Elevation (masl)	TOC Elevation (masl)	Date of Static Water Level Measurement	Depth to Water (mbtoc)	Potentiometric Elevation (masl)	Well Pair	Calculated Vertical Gradient (m/m)	Continuous Water Level Monitoring	Purging / Sampling Methodology
Background	FR_HMW5	FRO	1793.23	1785.2	1786.03	2018/01/30	Frozen	-			Q1 - Q4	Waterra
						2018/06/06	0.555	1785.48				
						2018/07/18	1.60	1784.43				
						2018/12/18	1.593	1784.44				
	CM_MW3-SH [2]	CMO	1571.76	1573.4	1574.14[5]	2018/03/27	3.12[6]	1571.09	CM_MW3-SH and CM_MW3-DP	0.039	-	Bladder Pump
						2018/06/25	2.795[6]	1571.42		0.034		
						2018/09/20	2.95[6]	1571.26		0.044		
						2018/11/15	2.854	1571.22		0.030		
	CM_MW3-DP [2]	CMO	1571.76	1573.4	1574.14[5]	2018/03/27	2.75[6]	1571.46			-	Bladder Pump
						2018/06/25	2.475[6]	1571.74				
						2018/09/20	2.54[6]	1571.67				
						2018/11/15	2.575	1571.50				
	GH_GA-MW-1	GHO	1378.81	1379.21	1380.26	2018/03/13	15.47	1364.79			Q1 and Q2	Bladder Pump
						2018/05/17	17.04	1363.22				
						2018/08/27	16.92	1363.34				
						2018/11/21	17.08	1363.18				
1	FR_09-01-A	FRO	1584.64	1584.10	1584.95	2018/02/22	Dry	-	FR_09-01-A and FR_09-01-B	-	-	Low-Flow
						2018/06/13	1.72	1583.23		-0.052		
						2018/07/31	3.73	1581.22		-0.053		
						2018/12/13	5.47	1579.48		-0.066		
	FR_09-01-B	FRO	1584.64	1584.10	1584.86	2018/02/22	9.191	1575.67			-	Waterra
						2018/06/13	2.28	1582.58				
						2018/07/31	4.31	1580.55				
						2018/12/13	6.21	1578.65				
	FR_GH_WELL4[3]	FRO	1576.45	1575.80	-	-	-	-			-	Distribution Point
	GH_MW-PC[2]	GHO	1573.37	1583.50	1582.28	2018/03/28	3.99	1578.29			-	Bladder Pump
						2018/06/19	3.87	1578.41				
						2018/08/20	4.40	1577.88				
						2018/12/12	4.20	1578.08				
2	LC_PIZDC1308	LCO	1721.68	1690.42	1691.37	2018/03/07	3.23	1688.14	LC_PIZDC1308 and LC_PIZDC1307	-0.130	Q1 - Q4	Low-Flow
						2018/06/13	2.15	1689.22		-0.034		
						2018/08/29	3.99	1687.38		-0.030		
						2018/11/27	3.28	1688.10		-0.107		
	LC_PIZDC1307	LCO	1721.68	1690.50	1691.21	2018/03/07	6.46	1684.75			Q1 - Q4	Low-Flow
						2018/06/13	2.885	1688.33				
						2018/08/29	4.60	1686.61				
						2018/11/26	5.93	1685.30				
3	GH_POTW09	GHO	1495.28	-	-	-	-	-			-	Distribution Point
	GH_POTW10	GHO	1488.94	-	-	-	-	-			-	Distribution Point
	GH_POTW15	GHO	1489.67	-	-	-	-	-			-	Distribution Point
	GH_POTW17	GHO	1505.18	1504.00	-	-	-	-			-	Distribution Point
	GH_MW-RLP-1D[2]	GHO	1494.78	1495.00	-	2018/03/06	6.55	1489.67			-	No Purge (Hydrasleeve™)
						2018/05/31	5.81	1490.41				
						2018/09/17	6.62	1489.60				
						2018/11/29	6.58	1489.64				
4	GH_MW-ERSC-1	GHO	1286.45	1283.36	1284.11	2018/03/07	5.27	1278.84			Q1 - Q4	Bladder Pump
						2018/05/16	3.14	1280.97				
						2018/09/12	5.92	1278.19				
						2018/10/17	5.97	1278.14				
	GH_GA-MW-2	GHO	1305.23	1306.66	1307.68	2018/03/21	4.83	1302.85			Q1 and Q2	Bladder Pump
						2018/05/17	3.34	1304.35				
						2018/09/12	5.55	1302.13				
						2018/11/26	6.00	1301.68				
	GH_GA-MW-3	GHO	1299.62	1299.78	1300.75	2018/03/07	8.86	1291.89			Q1 and Q2	Bladder Pump
						2018/05/16	3.24	1297.51				
						2018/09/12	8.82	1291.93				
						2018/11/26	9.10	1291.65				
	GH_GA-MW-4	GHO	1311.57	1312.15	1313.05	2018/03/21	6.81	1306.24			Q1	Bladder Pump
						2018/05/17	3.87	1309.19				
						2018/08/27	6.24	1306.81				
						2018/11/21	6.95	1306.10				
	RG_DW-01-03	RDW	1262.49	-	-	-	-	-			-	Distribution Point
	RG_DW-01-07	RDW	1244.76	-	-	-	-	-			-	Distribution Point
5/6	LC_PIZP1101	LCO	1266.65	1266.00	1267.06	2018/03/20	31.015	1236.05			Q1 and Q2	-
						2018/06/19	30.522	1236.54				
						2018/09/13	37.75[7]	1229.31[7]				
						2018/11/16	30.86	1236.20[8]				
7	EV_GV3gw	EVO	1307.01	1307.05	1307.96	2018/02/20	10.97	1296.99			Q1 - Q4	Bladder Pump
						2018/05/29	10.62	1297.34				
						2018/08/21	10.93	1297.03				
						2018/10/18	10.98	1296.99				
	RG_DW-02-20	RDW	1169.15	-	-	-	-	-			-	Distribution Point
8	EV_LSgw	EVO	1133.05	1133.00	1133.93	2018/02/15	4.323	1129.61			Q1 - Q4	Peristaltic Pump
						2018/05/10	3.747	1130.18				
						2018/09/06	4.439	1129.49				
						2018/10/09	4.478	1129.45				
	EV_OCgw	EVO	1125.48	1126.00	1126.89	2018/02/21	3.82	1123.07			Q1 - Q4	Peristaltic Pump
						2018/05/15	3.542	1123.35				
						2018/08/20	3.655	1123.24				
						2018/10/17	3.489	1123.40				
9	EV_BCgw	EVO	1153.15	1153.00	1153.86	2018/02/15	2.94	1150.92			Q1 - Q4	Peristaltic Pump
						2018/05/09	2.102	1151.76				
						2018/08/21	3.14	1150.72				
						2018/10/24	3.25	1151.37				
	EV_MCgwS	EVO	1131.04	1131.00	1131.96	2018/03/08	2.945	1129.02	EV_MCgwS and EV_MCgwD	-0.032	Q1 - Q4	Peristaltic Pump
						2018/05/10	1.75	1130.21		-0.042		
						2018/08/20	3.21	1128.76		-0.040		
						2018/10/17	3.102	1128.86		-0.044		
	EV_MCgwD	EVO	1131.04	1131.00	1131.84	2018/03/08	3.45	1128.39			Q1 - Q4	Bladder Pump
						2018/05/10	2.452	1129.39				
						2018/08/20	3.865	1127.98				
						2018/10/17	3.832	1128.01				
	EV_BRgw	EVO	1149.34	-	-	-	-	-			-	Distribution Point
	EV_RCgw	EVO	1162.02	-	-	-	-	-			-	Distribution Point
	EV_WH50gw	EVO	1159.14	-	-	-	-	-			-	Distribution Point
	EV_HW1[2,4]	EVO	1145.22	-	-	-	-	-			-	Distribution Point
	RG_DW-03-01	RDW	1127.54	-	-	-	-	-			-	Distribution Point

[1] Operation/Program refers to the Operation (.e., FRO, GHO, LCO, EVO, CMO) and/or Program (i.e., Operation SSGMP and RDW) that is responsible for carrying out the monitoring related to each Study Area.

[2] Supplemental groundwater monitoring locations.

[3] Prior to Q4 2017 greenhouse water supply wells, which include four wells (FR_GH_WELL1, FR_GH_WELL2, FR_GH_WELL3 and FR_GH_WELL4), were variably sampled. Beginning in Q4 2017 only FR_GH_WELL4 is sampled.

[4] EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.

[5] TOC elevation was surveyed from the steel casing and water level measurements prior to Q4 2018 were collected from the top of steel casing. Q4 and future measurements will be collected from the top of pipe casing. TOC elevation has been corrected to reflect estimated top of pipe casing.

[6] Groundwater elevation has been calculated based on water level measurement from top of steel casing and the TOC elevation of the steel casing.

[7] Depth to water and groundwater elevation may be erroneous.

[8] Potentiometric elevation for LC_PIZP1101 taken from 2018 LCO SSGMP report drawing.

"-" denotes data not available.

MU denotes Management Unit.

TOC denotes top of casing.

masl denotes meters above sea level.

mbgs denotes meters below ground surface.

mbtoc denotes meters below top of casing.

FRO, GHO, LCO, EVO, and CMO denotes Fording River Operations, Greenhills Oprtations, Line Creek Operations, Elkview Operations, and Coal Mountain Operations, respectively.

RDW denotes Regional Drinking Water Program.

TABLE 3 (Cont'd): Groundwater Monitoring Results and Calculated Vertical Gradients

Study Area	Well ID	Operation / Program[1]	LIDAR Ground Elevation (masl)	Ground Elevation (masl)	TOC Elevation (masl)	Date of Static Water Level Measurement	Depth to Water (mbtoc)	Potentiometric Elevation (masl)	Well Pair	Calculated Vertical Gradient (m/m)	Continuous Water Level Monitoring	Purging / Sampling Methodology
10	EV_ECgw	EVO	1327.17	1327.00	1327.74	2018/02/20	0.66	1327.08			Q1 and Q2	Peristaltic Pump
						2018/05/10	1.396	1326.34				
						2018/09/19	2.159	1325.58				
						2018/10/24	2.381	1325.36				
11	CM_MW1-OB	CMO	1494.47	1500.44	1501.20[5]	2018/03/22	3.29[6]	1498.00	CM_MW1-OB and CM_MW1-SH	-0.054	-	Bladder Pump
						2018/06/27	3.39[6]	1497.90		-0.049		
						2018/09/19	3.45[6]	1497.84		-0.056		
						2018/11/21	3.32	1497.88		-0.059		
	CM_MW1-SH	CMO	1494.47	1500.44	1501.19[5]	2018/03/22	4.28[6]	1497.01	CM_MW1-SH and CM_MW1-DP	0.042	-	Bladder Pump
						2018/06/27	4.29[6]	1497.00		0.037		
						2018/09/19	4.48[6]	1496.81		0.042		
						2018/11/21	4.285	1496.81		0.072		
	CM_MW1-DP	CMO	1494.47	1500.44	1501.75[5]	2018/03/22	3.70[6]	1497.59			-	No Purge (Hydrasleeve™)
						2018/06/27	3.78[6]	1497.51				
						2018/09/19	3.90[6]	1497.39				
						2018/11/21	3.85	1497.79				
12	EV_ER1gwS	EVO	1114.41	1115.25	1115.96	2018/02/21	5.32	1110.64	EV_ER1gwS and EV_ER1gwD	0.022	Q1 - Q4	Peristaltic Pump
						2018/05/16	3.86	1112.10		0.025		
						2018/09/18	5.24	1110.72		0.032		
						2018/10/09	5.317	1110.64		0.024		
	EV_ER1gwD	EVO	1114.35	1115.2	1115.91	2018/02/21	5.02	1110.89			-	Bladder Pump
						2018/05/16	3.53	1112.38				
						2018/09/18	4.83	1111.08				
						2018/10/09	4.993	1110.92				
	RG_DW-03-04	RDW	1113.23	-	-	-	-	-			-	Distribution Point

[1] Operation/Program refers to the Operation (.e., FRO, GHO, LCO, EVO, CMO) and/or Program (i.e., Operation SSGMP and RDW) that is responsible for carrying out the monitoring related to each Study Area.
[2] Supplemental groundwater monitoring locations.
[3] Prior to Q4 2017 greenhouse water supply wells, which include four wells (FR_GH_WELL1, FR_GH_WELL2, FR_GH_WELL3 and FR_GH_WELL4), were variably sampled. Beginning in Q4 2017 only FR_GH_WELL4 is sampled.
[4] EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.
[5] TOC elevation was surveyed from the steel casing and water level measurements prior to Q4 2018 were collected from the top of steel casing. Q4 and future measurements will be collected from the top of pipe casing. TOC elevation has been corrected to reflect estimated top of pipe casing.
[6] Groundwater elevation has been calculated based on water level measurement from top of steel casing and the TOC elevation of the steel casing.
[7] Depth to water and groundwater elevation may be erroneous.
[8] Potentiometric elevation for LC_PIZP1101 taken from 2018 LCO SSGMP report drawing.
"-" denotes data not available.
MU denotes Management Unit.
TOC denotes top of casing.
masl denotes meters above sea level.
mbgs denotes meters below ground surface.
mbtoc denotes meters below top of casing.
FRO, GHO, LCO, EVO, and CMO denotes Fording River Operations, Greenhills Oprtations, Line Creek Operations, Elkview Operations, and Coal Mountain Operations, respectively.
RDW denotes Regional Drinking Water Program.

TABLE 4: Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater

		Field Parameters				Physical Parameters						Dissolved Inorganics					Nutrients						Organics	
Sample Location	Sample Date (yyyy mm dd)	Temperature °C	pH (field) pH	Dissolved Oxygen mg/L	Conductivity µS/cm	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Bromide mg/L	Chloride mg/L	Fluoride µg/L	Sulphate mg/L	Ammonia Nitrogen µg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P mg/L	Total Organic Carbon mg/L	Dissolved Organic Carbon mg/L
BC Guideline/Standard																								
BCWQG Aquatic Life Short-term Maximum (AW)[a]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	400-1,507[e]	n/a	1,900-24,500[d] (15°C assumed)	32.8 (max)	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Long-Term Average (AW)[b]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-309[e]	135-1,780[d] (15°C assumed)	3	0.02-0.04[f]	n/a	n/a	n/a	n/a	n/a
CSR Aquatic Life (AW)[c]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[e]	1,280-4,290[e]	1,310-18,500[d]	400	0.2-2[f]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Background																								
FR_HMW5	2018 06 06	3.9	8.07	0.28	352.2	8.30	191	374	< 1.0	217	0.13	165	< 0.050	0.82	536	50.3	57.5	< 0.0050	< 0.0010	< 0.050	0.0196	0.0230	1.62	0.92
	2018 07 18	5.5	8.19	4.4	329.0	8.38	179	372	< 1.0	237	0.11	154	< 0.050	0.77	528	51.4	67.5	< 0.0050	< 0.0010	< 0.050	0.0016	0.0185	< 0.50	< 0.50
	2018 12 18	3.5	8.18	0.36	307.4	8.21	192	366	< 1.0	233	0.40	151	< 0.050	0.93	545	48.7	64.0	0.0054	< 0.0010	0.130	0.0313	0.0207	< 0.50	< 0.50
CM_MW3-SH	2018 03 27	2.1	7.72	9.52	326	8.42	160	342	< 1.0	183	0.56	155	< 0.050	3.84	110	14.8	9.9	0.0223	< 0.0010	< 0.050	0.0013	0.0039	0.62	1.93
	2018 06 25	9.2	7.86	8.51	333.6	8.03	172	322	< 1.0	192	0.28	169	< 0.050	1.86	128	15.1	< 5.0	0.0055	< 0.0010	< 0.050	0.0021	0.0023	1.37	1.69
	2018 09 20	4.55	7.84	7.85	324	8.24	173	325	< 1.0	212	1.09	175	< 0.050	1.53	123	14.8	28.9	0.0117	< 0.0010	0.083	0.0028	0.0048	2.24	1.37
	Duplicate	-	-	-	-	8.33	176	326	< 1.0	195	0.47	184	< 0.050	1.51	123	14.9	15.4	0.0124	< 0.0010	< 0.050	0.0026	0.0024	0.72	1.87
	QA/QC RPD%	*	*	*	*	1	2	< 1	*	8	*	5	*	1	0	1	*	*	*	*	*	*	*	*
	2018 11 15	4.0	7.55	6.64	337.8	8.33	168	331	< 1.0	169	0.34	165	< 0.050	2.00	128	15.9	20.0	0.0122	< 0.0010	< 0.050	0.0025	0.0037	0.67	0.76
CM_MW3-DP	2018 03 27	2.57	8.27	1.71	2,836	8.53	48.8	2,930	1.0	1,470	1.05	205	2.76	*811*	260	5.0	600	< 0.025	< 0.0050	0.564	0.0043	0.0109	< 0.50	< 0.50
	2018 06 25	8.9	8.43	0.38	2,710	8.31	48.2	2,630	1.5	1,470	0.96	217	2.62	*786*	400	4.8	593	< 0.025	< 0.0050	0.532	0.0032	0.0077	0.96	1.39
	Duplicate	-	-	-	-	8.32	48.8	2,640	1.3	1,440	0.90	214	2.67	*788*	430	1.6	605	< 0.025	< 0.0050	0.524	0.0038	0.0076	< 0.50	< 0.50
	QA/QC RPD%	*	*	*	*	< 1	1	< 1	*	2	6	1	2	< 1	7	100	2	*	*	2	*	1	*	*
	2018 09 20	4.4	8.36	0.08	2,777	8.22	48.5	2,710	3.5	1,450	2.70	225	2.56	*757*	500	4.2	590	0.083	< 0.0050	0.616	0.0012	0.0148	0.55	< 0.50
	2018 11 15	3.2	8.39	0.62	2,794	8.38	47.2	2,740	2.3	1,320	2.75	214	2.56	*740*	440	< 1.5	620	< 0.025	< 0.0050	0.600	0.0018	0.0144	0.62	< 0.50
	Duplicate	-	-	-	-	8.39	45.3	2,730	2.8	1,250	2.73	214	2.47	*735*	440	< 1.5	620	< 0.025	< 0.0050	0.559	0.0022	0.0139	0.67	0.60
	QA/QC RPD%	*	*	*	*	< 1	4	< 1	*	5	1	0	4	1	0	*	0	*	*	7	*	4	*	*
GH_GA-MW-1	2018 03 13	6.1	7.67	3.82	1,167	8.23	315	1,360	13.9	837	8.38	384	0.45	23.9	570	344	219	0.384	0.0114	0.406	0.0202	0.0632	5.54	5.24
	2018 05 17	7.2	7.46	2.53	1,158	8.42	346	1,220	10.9	825	8.01	367	0.442	18.6	682	269	290	0.640	0.0027	0.894	0.0262	0.0513	7.32	6.70
	2018 08 27	7.3	7.49	4.02	1,043	8.22	262	1,010	1.0	659	1.18	372	< 0.25	14.5	650	214	327	0.118	< 0.0050	0.421	0.0401	0.0398	2.92	3.28
	2018 11 21	2.5	7.51	1.34	1,112	8.22	306	1,150	2.8	688	3.05	346	< 0.25	15.3	630	240	243	1.49	< 0.0050	0.428	0.0324	0.0479	4.61	3.92
Study Area 1																								
FR_09-01-A	2018 06 13	6.8	7.31	9.54	1,002	8.27	633	1,050	1.6	808	0.20	268	< 0.25	< 2.5	240	239	14.5	31.6	0.0077	< 0.10	0.0020	0.0026	0.72	0.82
	2018 07 31	7.6	7.55	7.32	901	8.18	565	1,040	< 1.0	808	0.12	324	< 0.050	0.87	144	226	< 5.0	24.0	0.0038	< 0.050	0.0040	0.0027	0.53	2.34
	2018 12 13	5.6	7.36	7.49	904	7.89	560	956	< 1.0	729	0.11	235	< 0.050	3.09	164	297	62.0	11.5	< 0.0010	0.413	0.0128	0.253	0.71	0.70
FR_09-01-B	2018 02 22	6.8	7.20	7.09	1,216	7.81	716	1,330	1.0	984	1.05	410	< 0.050	4.08	133	378	8.5	17.0	< 0.0010	0.333	0.0013	0.0044	0.64	0.70
	Duplicate	-	-	-	-	7.77	698	1,290	1.0	955	0.97	418	< 0.050	4.08	127	378	7.9	17.0	< 0.0010	0.329	0.0015	0.0048	0.57	< 0.50
	QA/QC RPD%	*	*	*	*	1	3	3	*	3	8	2	*	0	5	0	*	0	*	1	*	*	*	*
	2018 06 13	5.6	7.09	10.03	928	8.25	550	952	< 1.0	715	0.19	217	< 0.25	< 2.5	210	222	6.1	29.3	0.0056	0.13	0.0012	0.0017	0.70	0.81
	2018 07 31	6.3	7.29	7.46	936	8.06	586	1,010	< 1.0	859	0.60	226	< 0.25	2.7	210	311	< 5.0	28.4	0.0090	< 0.050	0.0031	0.0013	1.15	0.79
	2018 12 13	6.6	7.39	9.18	777	7.94	471	845	< 1.0	648	0.49	192	< 0.050	1.85	216	262	20.5	12.8	< 0.0010	0.275	0.0097	< 0.0020	0.69	0.70
FR_GH_WELL4	2018 01 31	6.3	7.34	5.29	1,105	8.32	661	1,230	< 1.0	846	0.38	262	< 0.25	< 2.5	< 100	269	10.4	40.4	0.0080	0.224	0.0015	< 0.0010	0.96	1.33
	2018 06 14	8.4	7.14	4.81	935	8.41	567	968	< 1.0	724	0.23	254	< 0.050	1.31	138	207	31.2	22.4	0.0431	0.47	< 0.0010	< 0.0010	1.25	1.50
	2018 07 31	10.7	7.38	5.64	803	8.34	491	925	< 1.0	727	0.21	217	< 0.050	2.19	96	207	13.3	30.9	0.0320	< 0.050	0.0015	< 0.0010	0.80	1.22
	2018 12 13	9.9	7.34	4.50	1,038	7.98	669	1,090	4.8	838	8.44	266	< 0.050	2.02	114	271	28.1	31.6	0.0082	0.075	0.0117	< 0.0020	0.78	0.80
GH_MW-PC	2018 03 28	1.8	7.68	8.68	961	8.26	567	1,090	1.6	789	3.04	186	0.059	0.88	259	417	8.1	1.94	< 0.0010	< 0.050	0.0060	0.0071	0.91	1.08
	2018 06 19	6.8	7.55	6.73	1,048	8.43	669	1,140	137	881	74.3	239	< 0.25	< 2.5	420	481	11.6	2.49	< 0.0050	< 0.10	0.0082	0.121	5.5	1.80
	2018 08 20	8.0	7.37	4.53	1,023	8.03	648	983	443	847	271	233	< 0.25	1.09	390	423	7.7	1.56	< 0.0050	0.246	0.0086	0.309	8.8	1.83
	Duplicate	-	-	-	-	8.55	651	1,010	429	872	225	237	< 0.25	1.11	330	423	< 5.0	1.56	< 0.0050	0.292	0.0091	0.307	6.4	1.29
		*	*	*	*	6	0	3	3	3	19	2	*	2	17	0	*	0	*	*	6	1	32	*
	2018 12 12	2.8	7.70	8.12	1,030	8.34	628	1,040	-	-	-	212	< 0.25	< 2.5	330	430	44.0	2.14	< 0.0050	0.117	0.0150	0.0787	1.03	0.63

Data provided by Teck Coal Ltd.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.

RDL Denotes reported detection limit.

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[c] Standard to protect freshwater aquatic life.

[d] Guideline/standard varies with pH.

[e] Guideline/standard varies with hardness.

[f] Guideline/standard varies with chloride.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater

		Field Parameters				Physical Parameters						Dissolved Inorganics					Nutrients						Organics	
Sample Location	Sample Date (yyyy mm dd)	Temperature °C	pH (field) pH	Dissolved Oxygen mg/L	Conductivity µS/cm	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Bromide mg/L	Chloride mg/L	Fluoride µg/L	Sulphate mg/L	Ammonia Nitrogen µg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P mg/L	Total Organic Carbon mg/L	Dissolved Organic Carbon mg/L
BC Guideline/Standard																								
BCWQG Aquatic Life Short-term Maximum (AW)[a]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	400-1,507[e]	n/a	1,900-24,500[d] (15°C assumed)	32.8 (max)	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Long-Term Average (AW)[b]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-309[e]	135-1,780[d] (15°C assumed)	3	0.02-0.04[f]	n/a	n/a	n/a	n/a	n/a
CSR Aquatic Life (AW)[c]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[e]	1,280-4,290[e]	1,310-18,500[d]	400	0.2-2[f]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Study Area 2																								
LC_PIZDC1308	2018 03 07	1.5	7.89	0.09	399.5	8.31	270	452	2.5	267	8.70	268	< 0.050	< 0.50	293	2.02	52.6	< 0.0050	< 0.0010	-	< 0.0010	0.0039	-	2.13
	Duplicate	-	-	-	-	8.33	271	472	1.8	289	11.0	304	< 0.050	< 0.50	289	2.10	55.5	0.0052	< 0.0010	-	< 0.0010	0.0043	-	2.32
	QA/QC RPD%	*	*	*	*	< 1	0	4	*	8	23	13	*	*	1	4	5	*	*	-	*	*	-	*
	2018 06 13	6.3	7.17	0.18	659	8.47	366	611	< 1.0	363	0.13	362	< 0.050	1.96	154	5.53	< 5.0	0.181	< 0.0010	< 0.050	< 0.0010	0.0013	3.12	3.73
	2018 08 29	6.5	7.38	0.50	626.7	7.99	342	614	1.3	417	1.35	367	< 0.050	1.30	183	5.00	19.9	0.0383	< 0.0010	0.100	0.0016	< 0.002	2.97	3.59
	2018 11 27	4.0	7.28	0.12	481.2	8.26	333	560	5.1	322	14.1	339	< 0.050	0.88	208	5.10	125	< 0.0050	< 0.0010	0.229	< 0.0010	0.0048	2.36	2.45
LC_PIZDC1307	2018 03 07	1.1	8.25	0.19	302.9	8.30	194	398	2.0	240	8.62	236	< 0.050	< 0.50	536	< 0.30	89.7	< 0.0050	< 0.0010	-	< 0.0010	0.10	-	2.22
	2018 06 13	5.2	8.17	0.22	406.4	8.42	176	393	1.2	212	9.18	226	< 0.050	< 0.50	556	< 0.30	114	< 0.0050	< 0.0010	0.104	< 0.0010	0.011	1.81	2.12
	2018 08 29	5.9	8.08	1.32	392.7	8.41	176	383	19.3	271	26.5	228	< 0.050	0.18	558	< 0.30	122	< 0.0050	< 0.0010	0.636	0.0010	0.035	3.95	2.36
	2018 11 26	2.7	8.01	0.32	324.9	8.42	185	377	6.7	205	16.6	223	< 0.050	< 0.50	552	< 0.30	58.7	< 0.0050	< 0.0010	0.305	0.0011	0.021	2.52	2.59
Study Area 3																								
GH_POTW09	2018 03 13	10.8	7.49	2.39	704	8.19	407	745	1.2	472	3.33	250	< 0.25	6.59	770	165	26.1	< 0.025	< 0.0050	< 0.050	< 0.0010	< 0.0020	0.56	0.73
	2018 06 04	7.7	7.73	7.2	708	7.94	383	775	1.4	512	1.26	248	< 0.25	8.56	900	177	22.0	0.027	< 0.0050	< 0.050	< 0.0010	< 0.0020	0.87	0.75
	2018 09 17	7.1	7.43	1.81	695	8.43	1,100	723	< 1.0	476	1.02	217	< 0.050	6.47	778	165	47.5	0.0135	< 0.0010	0.085	< 0.0010	0.0029	< 0.50	< 0.50
	2018 10 16	8.6	7.54	5.59	717	8.03	407	747	< 1.0	504	0.94	257	< 0.050	6.66	798	166	38.9	0.0263	< 0.0010	0.210	< 0.0010	< 0.0020	0.60	1.23
GH_POTW10	2018 03 06	6.6	7.69	5.94	676	8.02	385	742	2.5	507	11.8	207	< 0.050	5.20	819	193	71.3	0.591	0.0160	0.094	< 0.0010	0.0026	0.60	0.64
	2018 06 11	10.8	7.49	2.39	704	8.20	426	726	1.1	515	10.4	225	< 0.050	5.68	968	198	69.8	0.269	0.0154	0.142	< 0.0010	0.0029	< 0.50	< 0.50
	2018 08 29	8.0	8.00	7.17	675	8.03	395	711	< 1.0	502	8.62	211	< 0.050	5.43	857	188	87.1	0.295	0.0109	0.076	< 0.0010	< 0.0020	0.80	0.76
	Duplicate	-	-	-	-	8.01	390	718	< 1.0	489	7.91	214	< 0.050	5.42	846	188	97.8	0.294	0.0111	0.084	< 0.0010	0.0024	0.56	0.60
	QA/QC RPD%	*	*	*	*	< 1	1	1	*	3	9	1	*	< 1	1	0	12	< 1	2	*	*	*	*	*
	2018 10 04	7.7	7.61	2.82	691	8.40	411	679	2.0	504	9.55	212	< 0.050	5.53	847	191	78.2	0.369	0.0109	0.165	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_POTW15	2018 03 06	6.1	7.69	6.62	843	7.99	470	936	2.3	660	13.4	232	< 0.25	28.5	190	251	40.7	< 0.025	< 0.0050	0.065	< 0.0010	< 0.0020	1.08	0.99
	2018 06 11	8.3	7.25	2.11	915	8.28	582	986	1.7	692	11.6	245	< 0.25	38.0	220	279	44.5	0.026	< 0.0050	0.078	< 0.0010	0.0017	0.98	0.97
	2018 08 29	7.1	7.63	6.76	884	7.93	509	916	< 1.0	636	10.9	241	< 0.25	33.5	200	291	59.0	< 0.025	< 0.0050	< 0.050	< 0.0010	< 0.0020	1.18	1.20
	2018 10 04	6.8	7.47	3.28	881	8.21	544	821	2.7	634	11.8	223	< 0.25	29.9	230	275	60.8	0.043	< 0.0050	0.129	< 0.0010	< 0.0020	0.90	0.66
GH_POTW17	2018 03 06	6.5	7.48	9.12	1,144	7.95	720	1,260	24.5	991	8.68	282	< 0.25	18.2	160	451	11.2	0.402	< 0.0050	0.061	< 0.0010	0.0170	0.93	1.03
	Duplicate	-	-	-	-	7.89	708	1,280	15.5	987	15.8	286	< 0.25	18.1	150	447	17.7	0.377	< 0.0050	0.053	< 0.0010	0.0130	1.31	0.90
	QA/QC RPD%	*	*	*	*	1	2	2	45	< 1	58	1	*	1	6	1	*	6	*	*	*	27	*	*
	2018 06 04	10.3	7.54	7.00	1,208	7.90	763	1,320	3.1	1,070	4.93	280	< 0.25	17.9	180	476	12.7	0.563	< 0.0050	0.174	< 0.0010	0.0054	1.10	0.97
	Duplicate	-	-	-	-	7.87	765	1,320	3.6	1,050	3.80	278	< 0.25	18.4	180	492	12.9	0.582	< 0.005	0.192	< 0.0010	0.0039	1.07	0.98
	QA/QC RPD%	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	3		*	*	*	*	*
	2018 08 30	10.2	7.47	6.43	1,168	8.00	683	1,210	3.3	980	2.42	289	< 0.25	17.8	170	453	38.8	0.450	< 0.0050	0.075	< 0.0010	0.0055	1.35	1.31
	2018 10 16	12.9	7.45	5.33	1,177	8.20	717	1,240	< 1.0	997	0.53	264	< 0.25	19.5	170	475	14.7	0.432	< 0.0050	0.142	< 0.0010	< 0.0020	1.23	1.41
	Duplicate	-	-	-	-	8.18	756	1,230	1.1	976	0.80	258	< 0.25	19.1	160	469	21.1	0.752	< 0.0050	0.127	< 0.0010	< 0.0020	1.10	1.67
	QA/QC RPD%	*	*	*	*	< 1	5	1	*	2	41	2	*	2	6	1	*	54	*	*	*	*	*	*

Data provided by Teck Coal Ltd.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.

RDL Denotes reported detection limit.

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[c] Standard to protect freshwater aquatic life.

[d] Guideline/standard varies with pH.

[e] Guideline/standard varies with hardness.

[f] Guideline/standard varies with chloride.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater

		Field Parameters				Physical Parameters						Dissolved Inorganics					Nutrients						Organics	
Sample Location	Sample Date (yyyy mm dd)	Temperature °C	pH (field) pH	Dissolved Oxygen mg/L	Conductivity µS/cm	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Bromide mg/L	Chloride mg/L	Fluoride µg/L	Sulphate mg/L	Ammonia Nitrogen µg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P mg/L	Total Organic Carbon mg/L	Dissolved Organic Carbon mg/L
BC Guideline/Standard																								
BCWQG Aquatic Life Short-term Maximum (AW)[a]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	400-1,507[e]	n/a	1,900-24,500[d] (15°C assumed)	32.8 (max)	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Long-Term Average (AW)[b]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-309[e]	135-1,780[d] (15°C assumed)	3	0.02-0.04[f]	n/a	n/a	n/a	n/a	n/a
CSR Aquatic Life (AW)[c]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[e]	1,280-4,290[e]	1,310-18,500[d]	400	0.2-2[f]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Study Area 3 (Cont'd)																								
GH_MW-RLP-1D	2018 03 06	4.3	8.01	3.0	411.5	8.34	217	405	4.7	224	45.2	216	< 0.050	0.42	*1.680*	0.68	< 5.0	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0060	3.03	2.65
	2018 05 31	7.9	8.2	4.16	365.1	8.14	219	400	4.9	218	44.2	202	< 0.050	< 0.50	*1.930*	0.67	< 20	< 0.0050	< 0.0010	< 0.050	0.0010	0.0069	6.60	6.73
	2018 09 17	8.5	8.38	2.77	297.4	8.72	160	316	17.1	155	20.6	179	< 0.050	0.73	*1.610*	< 0.30	12.2	< 0.0050	< 0.0010	0.197	< 0.0010	0.0097	9.48	10.0
	2018 11 29	5.7	8.88	4.66	252.4	8.38	158	280	9.7	153	10.2	147	< 0.050	0.82	*1.580*	< 0.30	27.2	< 0.0050	< 0.0010	< 0.050	0.0018	0.0029	15.9	15.8
Study Area 4																								
GH_MW-ERSC-1	2018 03 06	4.6	7.32	8.74	1,093	7.81	674	1,190	2.4	906	1.98	192	< 0.25	8.98	130	432	6.0	13.4	< 0.0050	0.304	0.0023	0.0086	1.35	1.68
	2018 05 16	6.7	7.46	9.62	449.9	7.98	258	439	2.3	304	0.20	188	< 0.050	2.03	170	66.8	13.5	1.42	0.0011	< 0.050	< 0.0010	0.0074	2.13	2.20
	Duplicate	-	-	-	-	8.00	248	442	1.2	300	0.47	195	< 0.050	2.03	170	66.8	17.1	1.40	< 0.0010	0.115	< 0.0010	0.0043	2.33	2.09
	QA/QC RPD%	*	*	*	*	< 1	4	1	*	1	*	4	*	0	0	0	*	1	*	*	*	*	*	*
	2018 09 12	9.1	7.11	7.91	558	8.09	330	598	1.4	371	0.45	328	< 0.050	1.14	175	17.7	11.8	0.0609	< 0.0010	0.062	0.0023	0.0081	2.36	2.41
	2018 10 17	8.1	7.29	8.08	544	7.92	311	569	1.4	341	0.51	314	< 0.050	1.15	185	16.6	47.1	0.0383	0.0015	0.129	0.0045	0.0088	1.88	2.12
	Duplicate	-	-	-	-	8.03	322	569	1.5	343	0.60	313	< 0.050	1.15	180	16.6	34.5	0.0437	0.0014	0.122	0.0044	0.0095	1.78	2.00
	QA/QC RPD%	*	*	*	*	1	3	0	*	1	16	< 1	*	0	3	0	31	13	*	*	*	8	*	*
GH_GA-MW-2	2018 03 21	4.6	7.28	1.31	894	7.97	556	1,010	3.3	727	0.86	213	< 0.25	7.46	100	272	< 5.0	16.1	< 0.0050	0.244	0.0027	0.0067	1.16	1.40
	2018 05 17	6.4	7.39	0.75	797	8.13	477	806	10.0	562	5.42	208	< 0.050	7.61	142	226	< 5.0	3.70	0.101	0.281	0.0022	0.0147	1.53	1.47
	2018 09 12	6.5	7.45	0.38	806	7.96	458	879	2.4	655	0.73	219	< 0.25	7.5	130	273	< 5.0	5.68	0.136	0.298	< 0.0010	0.0053	< 0.50	< 0.50
	2018 11 26	4.2	7.47	1.02	829	8.18	539	881	1.4	595	1.28	216	< 0.25	7.1	140	265	19.7	4.80	0.144	0.208	0.0023	0.0025	0.51	1.33
GH_GA-MW-3	2018 03 07	4.8	7.54	0.11	538	8.36	232	576	7.1	328	34.8	287	< 0.050	6.06	728	27.4	367	< 0.0050	< 0.0010	0.382	< 0.0010	0.0201	0.54	1.31
	2018 05 16	8.0	7.15	1.13	992	7.81	593	988	26.4	764	0.58	183	< 0.050	9.03	174	387	44.0	3.48	0.0800	0.436	< 0.0010	0.0128	2.96	3.24
	2018 09 12	6.5	7.49	0.22	556	8.42	243	588	12.6	378	52.2	287	< 0.050	6.11	694	45.8	371	0.0087	0.0011	0.484	0.0293	0.0342	1.63	1.15
	2018 11 26	4.5	7.56	1.20	551	8.49	255	579	2.6	290	39.8	292	< 0.050	6.39	750	30.9	334	0.0052	0.0011	0.391	0.0043	0.0058	< 0.50	< 0.50
GH_GA-MW-4	2018 03 21	4.7	7.59	6.56	380.1	8.08	231	434	< 1.0	248	< 0.10	174	< 0.050	3.95	206	45.7	< 5.0	0.523	< 0.0010	< 0.050	0.0014	< 0.0020	0.72	0.87
	2018 05 17	7.1	7.58	6.82	450.8	8.36	258	465	< 1.0	267	< 0.10	191	< 0.050	3.47	206	61.6	< 5.0	1.74	< 0.0010	0.110	0.0011	0.0023	2.98	2.93
	2018 08 27	9.3	7.65	4.80	375.9	8.22	200	368	< 1.0	199	0.15	188	< 0.050	2.36	197	36.7	15.4	0.848	< 0.0010	< 0.050	0.0016	< 0.0020	0.67	0.66
	2018 11 21	6	7.88	4.79	370.7	8.32	212	416	< 1.0	212	0.21	185	< 0.050	3.93	203	37.1	8.2	0.838	< 0.0010	< 0.050	0.0024	< 0.0020	0.97	1.16
RG_DW-01-03	2018 02 26	6.1	7.84	9.09	300.5	8.22	200	358	< 1.0	216	< 0.10	159	< 0.050	0.79	155	33.0	< 5.0	0.441	< 0.0010	0.059	< 0.0010	< 0.0020	< 0.50	0.54
	2018 04 30	6.6	7.75	11.20	328.5	8.51	182	378	< 1.0	220	< 0.10	158	< 0.050	0.88	149	34.4	< 5.0	0.591	< 0.0010	0.091	< 0.0010	0.0026	0.67	< 0.50
	2018 09 25	6.3	7.74	-	366.2	8.30	185	370	< 1.0	222	0.20	160	< 0.050	1.02	162	38.5	< 5.0	0.782	< 0.0010	0.152	< 0.0010	< 0.0020	< 0.50	< 0.50
	2018 11 26	5.57	7.25	11.23	351	8.28	188	343	< 1.0	169	0.35	156	< 0.050	0.82	155	35.4	17.5	0.670	< 0.0010	0.067	0.0010	< 0.0020	< 0.50	< 0.50
RG_DW-01-07	2018 02 26	6.7	7.21	7.43	676.0	8.03	458	761	< 1.0	489	0.18	375	< 0.25	9.08	< 100	66.9	< 5.0	0.838	< 0.0050	0.102	0.0016	0.0020	0.74	0.89
	2018 04 30	6.5	7.04	9.19	835	7.95	502	825	< 1.0	575	0.17	300	< 0.25	44.5	< 100	57.3	< 5.0	0.987	< 0.0050	0.157	0.0012	0.0045	1.28	0.66
	2018 09 25	6.6	7.14	7.4	797	7.96	430	779	1.1	476	0.23	386	< 0.25	3.81	< 100	63.7	< 5.0	0.712	< 0.0050	0.151	0.0013	< 0.0020	0.83	0.73
	2018 11 26	6.89	6.49	15.97	775	8.00	450	746	< 1.0	410	1.08	386	< 0.050	3.85	93	67.4	14.3	0.733	< 0.0010	0.105	0.0022	< 0.0020	0.93	1.00

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- Denotes analysis not conducted.

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QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.

RDL Denotes reported detection limit.

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[c] Standard to protect freshwater aquatic life.

[d] Guideline/standard varies with pH.

[e] Guideline/standard varies with hardness.

[f] Guideline/standard varies with chloride.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater

		Field Parameters				Physical Parameters						Dissolved Inorganics					Nutrients						Organics	
Sample Location	Sample Date (yyyy mm dd)	Temperature °C	pH (field) pH	Dissolved Oxygen mg/L	Conductivity µS/cm	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Bromide mg/L	Chloride mg/L	Fluoride µg/L	Sulphate mg/L	Ammonia Nitrogen µg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P mg/L	Total Organic Carbon mg/L	Dissolved Organic Carbon mg/L
BC Guideline/Standard																								
BCWQG Aquatic Life Short-term Maximum (AW)[a]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	400-1,507[e]	n/a	1,900-24,500[d] (15°C assumed)	32.8 (max)	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Long-Term Average (AW)[b]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-309[e]	135-1,780[d] (15°C assumed)	3	0.02-0.04[f]	n/a	n/a	n/a	n/a	n/a
CSR Aquatic Life (AW)[c]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[e]	1,280-4,290[e]	1,310-18,500[d]	400	0.2-2[f]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Study Area 5/6																								
LC_PIZP1101	2018 03 20	5.4	8.14	2.04	227.0	8.23	129	312	16.0	220	70.7	166	< 0.050	0.52	*1,720*	2.61	17.7	< 0.0050	< 0.0010	0.086	0.0074	0.085	1.07	0.88
	2018 06 19	11.7	8.14	6.62	325.5	8.31	135	315	17.6	193	31.8	175	< 0.050	0.85	*1,850*	2.71	21.9	0.0083	< 0.0010	< 0.050	0.0073	0.050	0.76	0.55
	2018 09 13	8.2	8.08	1.36	305.6	-	128	-	-	-	-	-	-	-	-	-	-	-	-	< 0.050	-	-	1.36	0.65
	2018 11 16	5.5	7.91	74.5	249.3	8.39	132	302	8.2	162	33.8	203	< 0.050	0.75	*1,740*	2.58	50.6	< 0.0050	< 0.0010	< 0.050	0.0085	0.046	0.56	0.51
Study Area 7																								
EV_GV3gw	2018 02 20	1.8	7.75	3.38	629	8.16	353	620	< 1.0	398	0.13	188	< 0.050	1.28	457	140	8.7	0.118	< 0.0010	< 0.050	0.0018	0.0024	< 0.50	0.65
	2018 05 29	6.6	7.53	3.37	635	8.19	356	628	< 1.0	414	0.12	243	< 0.050	1.59	526	150	< 5.0	0.133	0.0014	< 0.050	0.0021	0.0159	< 0.50	< 0.50
	2018 08 21	8.2	7.5	2.97	645	8.34	336	580	< 1.0	413	0.11	213	< 0.050	1.57	494	139	26.0	0.133	< 0.0010	0.104	< 0.0010	< 0.0020	< 0.50	< 0.50
	2018 10 18	6.1	7.4	2.56	631	8.03	328	615	< 1.0	421	0.23	224	0.113	1.46	428	132	21.6	0.120	< 0.0010	< 0.050	0.0019	0.0029	< 0.50	< 0.50
RG_DW-02-20	2018 02 13	5.9	7.48	9.14	429	8.06	257	476	1.2	300	2.95	168	< 0.050	2.65	195	75.4	< 5.0	2.73	< 0.0010	0.155	< 0.0010	< 0.0020	0.53	0.74
	Duplicate	-	-	-	-	8.00	261	474	1.1	298	3.93	167	< 0.050	2.65	195	75.6	< 5.0	2.74	< 0.001	0.152	< 0.0010	< 0.0020	< 0.50	0.50
		*	*	*	*	1	2	< 1	*	1	28	1	*	0	0	< 1	*	*		*	*	*	*	*
	2018 04 25	6.1	7.54	8.97	495.4	8.20	250	491	< 1.0	305	0.57	172	< 0.050	3.07	200	78.9	< 5.0	2.97	< 0.0010	0.157	< 0.0010	< 0.0020	0.59	0.59
	2018 09 26	7.5	7.39	8.32	446.1	8.03	226	439	< 1.0	274	0.77	175	< 0.050	1.67	211	58.9	< 5.0	2.08	< 0.0010	0.193	0.0011	< 0.0020	< 0.50	< 0.50
	2018 11 26	6.76	7.43	8.80	412	8.21	232	439	< 1.0	236	1.10	171	< 0.050	1.95	206	63.9	15.8	2.37	< 0.0010	0.288	0.0012	< 0.0020	< 0.50	< 0.50
Study Area 8																								
EV_LSgw	2018 02 15	5.6	7.47	0.35	951	8.01	547	973	9.8	565	17.4	508	< 0.050	9.09	197	77.1	169	0.0060	< 0.0010	0.159	< 0.0010	0.0379	3.05	2.90
	2018 05 10	8.8	7.22	0.3	1,034	8.36	563	951	6.7	577	22.1	512	0.050	8.00	251	78.1	157	< 0.0050	0.0013	0.315	< 0.0010	0.0431	3.20	3.39
	2018 09 06	12.4	7.14	0.15	1,147	8.34	619	954	8.6	586	44.1	474	< 0.25	9.2	330	70.0	217	< 0.025	< 0.0050	0.214	0.0010	0.0387	2.65	2.73
	2018 10 09	11.6	7.29	0.39	1,063	8.27	574	862	12.3	598	40.8	460	< 0.25	9.0	290	71.0	234	0.078	< 0.0050	0.331	< 0.0010	0.0452	3.77	2.81
EV_OCgw**	2018 02 21	4.91	7.7	1.34	451	8.03	145	473	11.2	284	9.01	177	< 0.050	1.69	*1,200*	62.3	61.4	0.0207	0.0021	0.237	0.0070	0.0237	< 0.50	< 0.50
	Duplicate	-	-	-	-	8.02	143	465	8.4	286	5.39	201	< 0.050	1.71	*1,200*	60.4	61.1	0.0284	< 0.0010	0.074	0.0068	0.0226	< 0.50	< 0.50
	QA/QC RPD%	*	*	*	*	< 1	1	2	29	1	50	13	*	1	0	3	< 1	*	*	*	3	5	*	*
	2018 05 15	9.47	7.28	0.53	477	8.41	146	467	1.7	288	1.59	181	< 0.050	2.10	*1,280*	62.9	50.6	0.0114	0.0031	< 0.050	0.0043	0.0133	0.50	0.85
	Duplicate	-	-	-	-	8.54	149	455	< 1.0	298	0.92	183	< 0.050	2.10	*1,280*	60.3	42.7	0.0336	0.0027	< 0.050	0.0053	0.0117	< 0.50	0.73
	QA/QC RPD%	*	*	*	*	2	2	3	*	3	53	1	*	0	0	4	17	*	*	*	*	13	*	*
	2018 08 20	10.4	7.83	0.35	502	8.57	154	486	4.7	294	2.95	200	< 0.050	2.11	*1,260*	71.5	74.8	< 0.0050	0.0015	0.123	0.0093	0.0191	0.62	0.64
	Duplicate	-	-	-	-	8.35	154	471	3.9	308	2.44	195	< 0.050	2.20	*1,310*	70.5	72.0	< 0.0050	< 0.0010	0.142	0.0089	0.0194	0.53	0.54
	QA/QC RPD%	*	*	*	*	3	0	3	*	5	19	3	*	4	4	1	4	*	*	*	4	2	*	*
	2018 10 17	8.6	7.96	0.21	747.2	8.04	149	440	< 1.0	278	2.17	206	0.064	2.10	*1,160*	64.5	86.3	< 0.0050	0.0014	0.149	0.0083	0.0210	< 0.50	< 0.50
	Duplicate	-	-	-	-	8.31	149	482	1.1	281	2.35	192	0.070	2.19	*1,150*	65.1	88.4	0.0114	0.0015	0.124	0.0084	0.0212	< 0.50	< 0.50
	QA/QC RPD%	*	*	*	*	3	0	9	*	1	8	7	*	4	1	1	2	*	*	*	1	1	*	*
Study Area 9																								
EV_BCgw	2018 02 15	5.9	7.44	2.83	1,010	7.81	582	1,040	1.8	788	1.10	271	< 0.050	9.46	102	311	< 5.0	8.25	0.0131	< 0.050	0.0035	0.0035	0.77	0.74
	Duplicate	-	-	-	-	7.81	572	1,040	1.4	771	0.67	270	< 0.050	9.38	106	311	5.4	8.23	0.0059	0.088	0.0035	0.0035	< 0.50	< 0.50
	QA/QC RPD%	*	*	*	*	0	2	0	*	2	49	< 1	*	1	4	0	*	< 1	76	*	*	*	*	*
	2018 05 09	6.9	7.24	2.31	989	8.24	546	990	7.7	740	2.18	204	< 0.050	9.14	154	289	< 5.0	7.46	< 0.0010	0.439	0.0041	0.0108	1.06	1.07
	2018 08 21	6.8	7.27	2.69	937	8.17	491	781	4.9	675	1.01	145	< 0.25	7.99	160	287	10.0	6.17	< 0.0050	0.336	0.0010	0.0070	0.70	0.75
	2018 10 24	5.6	7.3	2.73	870	7.89	493	832	3.4	608	2.64	217	0.146	7.04	136	253	13.1	4.98	< 0.0010	0.275	0.0021	0.0071	1.34	1.40

Data provided by Teck Coal Ltd.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.

RDL Denotes reported detection limit.

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[c] Standard to protect freshwater aquatic life.

[d] Guideline/standard varies with pH.

[e] Guideline/standard varies with hardness.

[f] Guideline/standard varies with chloride.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater

		Field Parameters				Physical Parameters						Dissolved Inorganics					Nutrients						Organics	
Sample Location	Sample Date (yyyy mm dd)	Temperature °C	pH (field) pH	Dissolved Oxygen mg/L	Conductivity µS/cm	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Bromide mg/L	Chloride mg/L	Fluoride µg/L	Sulphate mg/L	Ammonia Nitrogen µg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P mg/L	Total Organic Carbon mg/L	Dissolved Organic Carbon mg/L
BC Guideline/Standard																								
BCWQG Aquatic Life Short-term Maximum (AW)[a]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	400-1,507[e]	n/a	1,900-24,500[d] (15°C assumed)	32.8 (max)	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Long-Term Average (AW)[b]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-309[e]	135-1,780[d] (15°C assumed)	3	0.02-0.04[f]	n/a	n/a	n/a	n/a	n/a
CSR Aquatic Life (AW)[c]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[e]	1,280-4,290[e]	1,310-18,500[d]	400	0.2-2[f]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Study Area 9 (Cont'd)																								
EV_MCgwS	2018 03 08	2.7	7.29	0.65	852	8.12	366	792	5.8	513	22.3	250	0.206	40.8	259	109	126	< 0.0050	< 0.0010	0.121	< 0.0010	0.0039	1.17	1.59
	2018 05 10	7.2	7.28	0.33	898	7.98	391	819	6.7	516	29.5	266	0.158	38.4	385	134	143	< 0.0050	0.0016	0.316	< 0.0010	0.0039	1.24	1.30
	2018 08 20	9.7	7.1	0.53	865	8.28	388	820	4.3	532	13.5	256	0.171	39.2	446	135	171	0.0613	< 0.0010	0.249	< 0.0010	0.0054	1.52	1.42
	2018 10 17	7.9	7.35	0.34	866	7.91	367	801	9.0	527	18.5	271	0.257	42.6	446	161	180	0.104	0.0069	0.305	< 0.0010	0.0136	2.47	2.15
EV_MCgwD	2018 03 08	2.8	8.23	14.28	535	8.41	239	533	34.0	321	25.8	233	0.077	6.49	873	47.1	14.2	0.102	0.0045	0.219	< 0.0010	0.0433	2.38	1.91
	2018 05 10	10.8	7.56	10.71	583	8.40	243	595	599	377	410	259	< 0.050	3.24	*1,130*	85.1	126	0.0671	0.0054	0.634	0.0092	0.583	< 2.5	1.32
	2018 08 20	12.1	7.36	6.20	606	8.43	230	570	184	376	155	244	< 0.050	4.57	*1,060*	69.6	112	0.131	0.0036	0.524	0.0051	0.351	< 5.0	1.65
	2018 10 17	6.6	7.46	3.22	574	8.07	240	540	156	349	103	259	0.082	3.67	998	69.3	76.2	0.0794	0.0043	0.394	0.0051	0.225	1.82	2.17
EV_BRgw	2018 02 14	7.2	7.4	4.18	1,225	8.08	683	1,260	< 1.0	934	0.33	315	0.412	43.2	96	346	9.2	4.90	< 0.0010	< 0.10	0.0020	0.0019	0.69	0.57
	2018 05 02	7.4	7.29	3.97	1,120	8.32	672	1,110	1.2	808	0.32	227	< 0.25	31.1	180	379	9.8	4.54	0.0458	0.192	< 0.0010	-	0.74	0.76
	2018 08 21	8	7.09	2.47	1,263	8.14	693	1,010	1.7	931	0.17	162	< 0.25	22.2	140	396	46.6	9.20	0.0123	0.394	< 0.0010	0.0036	0.90	0.75
	2018 10 16	8.9	7.12	1.23	1,232	8.10	678	1,180	6.7	872	4.16	211	0.141	21.5	128	382	10.7	7.10	0.0154	< 0.050	0.0050	0.0082	0.57	0.61
EV_RCgw	2018 02 14	21.8	7.43	6.97	2,353	8.06	1,570	2,420	< 1.0	2,120	0.11	308	< 0.25	10.5	< 100	1,140	8.6	35.0	0.103	< 0.10	0.0028	0.0033	1.08	0.83
	2018 05 02	21.1	7.49	6.86	2,377	8.46	1,640	2,330	1.2	2,150	0.11	271	< 0.25	15.8	200	1,240	8.3	37.6	0.0158	0.578	< 0.0010	-	1.69	1.68
	2018 08 21	21.1	7.20	6.45	2,410	8.15	1,570	1,980	< 1.0	2,120	1.68	180	< 1.0	9.9	< 400	1,150	9.4	36.5	< 0.020	0.555	< 0.0010	0.0032	1.57	1.62
	2018 10 16	10.3	6.90	4.30	2,418	8.23	1,550	2,360	2.9	2,060	< 0.10	247	0.34	14.6	200	1,190	9.8	36.5	< 0.0050	0.603	0.0062	0.0074	1.11	1.15
EV_WH50gw	2018 02 14	5.8	7.97	9.25	564	8.04	282	563	6.2	361	13.7	219	< 0.050	2.36	98	114	7.9	1.87	< 0.0010	0.088	0.0038	0.0149	0.74	0.68
	2018 05 02	4.5	7.88	9.26	459.9	8.45	259	472	3.2	288	4.27	151	< 0.050	3.41	147	90.6	10.4	1.29	0.0011	0.128	0.0041	-	1.08	1.05
	2018 08 21	9.3	7.67	3.63	614	8.38	319	549	7.9	383	12.0	163	0.060	3.39	158	150	12.8	2.89	< 0.0010	0.267	< 0.0010	0.0135	1.16	1.13
	2018 10 16	10.9	7.81	4.89	634	8.45	326	626	2.0	405	2.81	182	0.203	3.44	158	154	10.4	2.35	< 0.0010	0.295	0.0059	0.0178	0.91	1.03
RG_DW-03-01	2018 02 26	7.9	7.20	1.27	701	8.05	451	787	1.9	500	1.71	344	< 0.25	36.5	170	65.4	< 5.0	0.053	< 0.0050	< 0.050	< 0.0010	< 0.0020	0.94	1.03
	2018 04 23	8.2	7.20	6.56	837	8.09	418	819	1.5	498	1.53	349	< 0.25	40.3	190	65.7	< 5.0	0.080	< 0.0050	< 0.050	< 0.0010	< 0.0020	0.97	1.04
	2018 09 27	7.9	7.01	1.64	836	7.53	448	808	1.0	508	1.13	328	< 0.25	37.7	180	61.4	< 5.0	0.090	< 0.0050	< 0.050	0.0010	< 0.0020	0.90	0.84
	2018 11 27	7.93	7.08	3.68	824	7.96	442	794	< 1.0	488	1.13	346	0.162	38.6	181	59.9	< 5.0	0.104	< 0.0010	0.052	0.0014	0.0051	1.08	1.02
Study Area 10																								
EV_ECgw	2018 02 20	1.20	7.57	1.87	412.30	8.19	177	411	1,050	324	823	191	< 0.050	0.90	764	25.1	184	0.112	0.0066	1.01	0.0129	1.15	19	2.84
	2018 05 10	5.40	7.57	2.12	410.30	8.36	157	394	233	261	179	194	< 0.050	0.57	840	24.9	111	0.147	0.0101	0.314	0.0130	0.189	< 2.5	0.85
	2018 09 19	13.05	7.17	3.35	435.00	8.06	178	418	20.3	306	21.8	203	< 0.050	0.99	850	26.7	109	0.131	0.0100	0.588	0.0076	0.0260	2.29	2.63
	2018 10 24	6.8	7.53	2.15	410.6	8.40	178	404	100	245	68.3	230	< 0.050	0.56	910	25.0	126	0.127	0.0091	0.279	0.0218	0.108	4.9	1.95
Study Area 11																								
CM_MW1-OB	2018 03 22	2.4	7.28	3.52	1,067	8.08	547	1,090	1.1	697	0.56	261	0.266	44.5	63	272	< 5.0	0.726	< 0.0010	0.274	0.0016	0.0033	0.70	< 0.50
	2018 06 27	11.2	7.20	5.84	557.4	8.26	559	1,140	< 1.0	817	0.13	276	0.38	56.7	< 100	293	< 5.0	0.538	< 0.0050	< 0.050	0.0033	0.0025	1.20	2.58
	2018 09 19	9.37	7.27	9.22	1,392	7.87	628	1,430	< 1.0	956	0.35	306	0.29	*147*	110	322	44.5	0.489	< 0.0050	0.130	0.0020	0.0024	1.23	1.16
	Duplicate	-	-	-	-	7.88	643	1,420	< 1.0	975	0.35	302	0.29	*147*	< 100	324	27.5	0.520	< 0.0050	0.106	0.0020	0.0052	1.12	1.33
	QA/QC RPD%	*	*	*	*	< 1	2	1	*	2	*	1	0	0	*	1	47	6	*	*	*	*	*	*
	2018 11 21	4.4	7.11	8.21	1,536	8.17	588	1,560	1.0	919	0.33	286	0.30	*191*	110	264	< 5.0	0.707	< 0.0050	0.170	< 0.0010	< 0.0020	0.77	0.82

Data provided by Teck Coal Ltd.

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n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.

RDL Denotes reported detection limit.

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[c] Standard to protect freshwater aquatic life.

[d] Guideline/standard varies with pH.

[e] Guideline/standard varies with hardness.

[f] Guideline/standard varies with chloride.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater

		Field Parameters				Physical Parameters						Dissolved Inorganics					Nutrients						Organics	
Sample Location	Sample Date (yyyy mm dd)	Temperature °C	pH (field) pH	Dissolved Oxygen mg/L	Conductivity µS/cm	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Bromide mg/L	Chloride mg/L	Fluoride µg/L	Sulphate mg/L	Ammonia Nitrogen µg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P mg/L	Total Organic Carbon mg/L	Dissolved Organic Carbon mg/L
BC Guideline/Standard																								
BCWQG Aquatic Life Short-term Maximum (AW)[a]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	400-1,507[e]	n/a	1,900-24,500[d] (15°C assumed)	32.8 (max)	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Long-Term Average (AW)[b]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-309[e]	135-1,780[d] (15°C assumed)	3	0.02-0.04[f]	n/a	n/a	n/a	n/a	n/a
CSR Aquatic Life (AW)[c]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[e]	1,280-4,290[e]	1,310-18,500[d]	400	0.2-2[f]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Study Area 11 (Cont'd)																								
CM_MW1-SH	2018 03 22	3.06	8.07	2.68	1,177	8.39	124	1,180	< 1.0	601	2.60	196	1.02	*240*	844	15.2	45.0	< 0.0050	< 0.0010	0.077	0.0041	0.0121	0.92	1.04
	Duplicate	-	-	-	-	8.35	124	1,110	< 1.0	560	3.00	200	0.892	*215*	765	15.3	51.2	< 0.0050	< 0.0010	0.093	0.0023	0.0141	0.74	0.84
	QA/QC RPD%	*	*	*	*	< 1	0	6	*	7	14	2	13	11	10	1	13	*	*	*	*	15	*	*
	2018 06 27	8.1	7.91	0.02	1,028	8.43	123	1,060	3.4	564	6.43	198	0.84	*206*	600	12.0	52.8	< 0.025	< 0.0050	< 0.050	0.0027	0.0125	0.93	0.99
	2018 09 19	6.9	7.99	0.23	1,048	7.91	107	1,050	7.1	548	14.4	220	0.80	*217*	920	16.1	73.9	0.041	< 0.0050	0.090	0.0028	0.0238	1.34	1.56
	2018 11 21	4.2	8.27	0.20	1,175	8.42	104	1,150	1.4	547	3.00	230	0.92	*226*	980	11.5	41.6	< 0.025	< 0.0050	0.075	0.0044	0.0073	0.75	0.86
	Duplicate	-	-	-	-	8.43	106	1,010	1.7	465	3.83	228	0.71	*181*	830	10.8	57.3	< 0.025	< 0.0050	0.095	0.0026	0.0301	0.91	0.89
	QA/QC RPD%	*	*	*	*	< 1	2	13	*	16	24	1	26	22	17	6	32	*	*	*	*	122	*	*
CM_MW1-DP	2018 03 22	4.93	7.85	4.30	1,262	8.37	146	1,310	6.5	715	13.0	335	0.875	*218*	156	1.84	590	< 0.0050	< 0.0010	0.690	< 0.0010	0.0167	1.86	1.22
	2018 06 27	8.2	7.87	0.84	1,312	8.48	150	1,350	6.4	743	7.17	357	0.91	*229*	150	< 1.5	610	0.058	< 0.0050	0.50	0.0096	0.0160	0.94	0.99
	Duplicate	-	-	-	-	8.52	153	1,320	5.0	751	5.93	342	0.93	*231*	150	< 1.5	610	0.035	< 0.0050	0.627	0.0158	0.0242	1.05	1.02
	QA/QC RPD%	*	*	*	*	< 1	2	2	25	1	19	4	2	1	0	*	0	49	*	23	49	41	*	*
	2018 09 19	6.2	7.88	1.68	1,210	8.14	147	1,290	139	706	96.0	387	0.86	*227*	230	4.5	600	0.084	< 0.0050	0.795	0.0066	0.194	< 10	1.98
	2018 11 21	4.4	7.77	1.85	1,358	8.43	141	1,320	20.7	657	16.1	349	0.77	*210*	240	2.0	630	< 0.025	0.0065	0.728	0.0076	0.0612	1.88	2.11
Study Area 12																								
EV_ER1gwS	2018 02 21	2.25	7.46	9.02	548	7.82	277	577	< 1.0	355	0.17	252	< 0.050	10.4	122	82.2	7.7	2.08	< 0.0010	0.54	0.0026	0.0039	< 0.50	< 0.50
	2018 05 16	7.76	7.47	8.38	583	7.95	268	512	< 1.0	379	0.12	209	< 0.050	17.5	170	77.7	< 5.0	1.89	< 0.0010	< 0.20	< 0.0010	0.0022	< 0.50	< 0.50
	2018 09 18	11.4	7.61	7.15	444	8.07	244	459	< 1.0	308	0.21	167	< 0.050	2.84	221	74.5	< 5.0	1.97	< 0.0010	0.389	0.0018	< 0.0020	0.72	0.77
	2018 10 09	9.1	7.82	8.23	462.1	8.38	233	453	< 1.0	290	0.18	175	< 0.050	3.31	207	71.2	< 5.0	1.85	< 0.0010	0.057	0.0033	0.0030	< 0.50	< 0.50
EV_ER1gwD	2018 02 21	1.1	7.64	9.08	476	7.89	247	507	45.8	326	22.8	182	< 0.050	3.83	164	75.3	7.5	1.93	< 0.0010	0.40	0.0030	0.0791	< 0.50	< 0.50
	2018 05 16	6.67	8.01	12.77	462	8.16	228	418	567	293	195	225	< 0.050	4.67	201	54.4	6.0	1.44	< 0.0010	0.75	0.0015	0.917	3.12	0.59
	2018 09 18	13.12	7.39	4.71	462	8.20	233	449	8.2	279	7.43	214	< 0.050	5.73	261	34.8	9.8	0.704	< 0.0010	0.352	< 0.0010	0.0088	1.82	1.75
	2018 10 09	8.5	7.88	6.9	458.3	8.16	229	408	21.6	268	9.61	175	< 0.050	5.14	243	40.7	27.2	0.937	< 0.0010	0.081	0.0018	0.0260	0.66	< 0.50
RG_DW-03-04	2018 02 26	7.8	7.51	7.94	486.4	8.11	306	552	< 1.0	373	0.32	174	< 0.050	8.38	155	114	< 5.0	2.31	< 0.0010	0.179	0.0027	0.0028	0.79	0.66
	2018 04 30	6.7	7.62	7.93	575.0	8.41	335	637	< 1.0	424	0.11	179	< 0.050	15.3	136	122	< 5.0	2.24	< 0.0010	0.183	0.0024	0.0048	0.82	0.64
	2018 09 27	5.8	7.23	6.24	596.8	7.90	318	572	< 1.0	403	< 0.10	180	0.078	7.29	161	124	< 5.0	2.10	< 0.0010	0.145	0.0029	0.0024	0.59	< 0.50
	2018 11 27	7.11	7.17	8.14	583	8.12	316	577	< 1.0	371	0.21	187	0.129	7.07	153	122	17.9	1.81	< 0.0010	0.173	0.0034	0.0025	0.56	0.60
Field Blank																								
CM_MW3-SH	2018 09 20	-	-	-	-	5.39	< 0.50	< 2.0	< 1.0	< 10	0.23	< 1.0	< 0.050	< 0.50	< 20	< 0.30	15.0	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
CM_MW3-DP	2018 06 25	-	-	-	-	5.45	< 0.50	< 1.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	7.3	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.50	< 0.50
CM_MW3-DP	2018 11 15	-	-	-	-	5.47	164	< 2.0	< 1.0	< 10	0.17	< 1.0	< 0.050	< 0.50	< 20	< 0.30	16.1	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
FR_09-01-B	2018 12 13	-	-	-	-	5.68	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	616	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_MW-PC	2018 08 20	-	-	-	-	5.82	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.10	< 20	< 0.30	271	< 0.0050	< 0.0010	0.319	0.0011	< 0.0020	< 0.50	< 0.50
GH_POTW10	2018 08 29	-	-	-	-	5.71	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.10	< 20	< 0.30	108	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_POTW17	2018 03 06	-	-	-	-	5.50	< 0.50	< 2.0	< 1.0	< 3.0	< 0.10	< 1.0	< 0.050	< 0.10	< 20	< 0.30	< 5.0	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_POTW17	2018 06 04	-	-	-	-	5.35	< 0.50	< 2.0	< 1.0	< 3.0	< 0.10	< 1.0	< 0.050	< 0.10	< 20	< 0.30	< 5.0	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_POTW17	2018 10 16	-	-	-	-	5.73	< 0.5	< 2	< 1	< 10	0.13	< 1	< 0.05	< 0.5	< 20	< 0.3	16.3	< 0.005	< 0.001	0.093	0.0013	< 0.002	< 0.5	< 0.5
GH_MW-ERSC-1	2018 05 16	-	-	-	-	5.41	< 0.50	< 2.0	< 1.0	< 10	0.20	< 1.0	< 0.050	< 0.50	< 20	< 0.30	< 5.0	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.50	< 0.50
GH_MW-ERSC-1	2018 03 06	-	-	-	-	5.35	< 0.50	< 2.0	< 1.0	< 3.0	< 0.10	< 1.0	< 0.050	< 0.10	< 20	< 0.30	< 5.0	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	1.51
GH_MW-ERSC-1	2018 10 17	-	-	-	-	5.66	< 0.5	< 2	< 1	< 10	< 0.1	< 1	< 0.05	< 0.5	< 20	< 0.3	41.5	< 0.005	0.0011	0.135	0.001	0.0032	< 0.5	< 0.5

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n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.
RDL Denotes reported detection limit.

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[c] Standard to protect freshwater aquatic life.
[d] Guideline/standard varies with pH.
[e] Guideline/standard varies with hardness.
[f] Guideline/standard varies with chloride.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater

		Field Parameters				Physical Parameters						Dissolved Inorganics					Nutrients						Organics	
Sample Location	Sample Date (yyyy mm dd)	Temperature °C	pH (field) pH	Dissolved Oxygen mg/L	Conductivity µS/cm	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Bromide mg/L	Chloride mg/L	Fluoride µg/L	Sulphate mg/L	Ammonia Nitrogen µg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P mg/L	Total Organic Carbon mg/L	Dissolved Organic Carbon mg/L
BC Guideline/Standard																								
BCWQG Aquatic Life Short-term Maximum (AW)[a]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	400-1,507[e]	n/a	1,900-24,500[d] (15°C assumed)	32.8 (max)	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Long-Term Average (AW)[b]		n/a	6.5 - 9	n/a	n/a	6.5 - 9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-309[e]	135-1,780[d] (15°C assumed)	3	0.02-0.04[f]	n/a	n/a	n/a	n/a	n/a
CSR Aquatic Life (AW)[c]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[e]	1,280-4,290[e]	1,310-18,500[d]	400	0.2-2[f]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Field Blank (Cont'd)																								
LC_PIZP1101	2018 06 19	-	-	-	-	5.36	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	340	< 0.0050	< 0.0010	0.198	< 0.0010	<0.0010	< 0.50	< 0.50
RG_DW-02-20	2018 02 13	-	-	-	-	5.43	< 0.5	< 2	< 1	< 3	0.12	< 1	< 0.05	< 0.1	< 20	< 0.3	< 5	< 0.005	< 0.001	< 0.05	< 0.001	< 0.002	< 0.5	< 0.5
EV_OCgw	2018 02 21	-	-	-	-	5.44	< 0.50	< 2.0	< 1.0	< 10	< 0.10	1.0	< 0.050	< 0.50	< 20	< 0.30	8.4	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.50	< 0.50
EV_OCgw	2018 05 15	-	-	-	-	5.63	< 0.50	< 2.0	< 1.0	< 10	0.29	< 1.0	< 0.050	< 0.50	< 20	< 0.30	< 5.0	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.50	< 0.50
EV_OCgw	2018 08 20	-	-	-	-	5.82	< 0.50	< 2.0	< 1.0	< 10	< 0.10	1.0	< 0.050	< 0.50	< 20	< 0.30	7.3	0.0067	< 0.0010	0.083	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_OCgw	2018 10 17	-	-	-	-	5.68	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	28.5	< 0.0050	< 0.0010	0.052	0.0014	0.0029	< 0.50	< 0.50
EV_BCgw	2018 02 15	-	-	-	-	5.45	< 0.50	< 2.0	< 1.0	< 10	0.18	< 1.0	< 0.050	< 0.50	< 20	< 0.30	< 5.0	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.50	< 0.50
RG_DW-03-01	2018 09 27	-	-	-	-	5.84	< 0.50	< 2.0	< 1.0	< 3.0	< 0.10	< 1.0	< 0.050	< 0.10	< 20	< 0.30	5.9	< 0.0050	< 0.0010	< 0.050	0.0010	< 0.0020	< 0.50	0.58
CM_MW1-OB	2018 09 19	-	-	-	-	5.56	< 0.50	< 2.0	< 1.0	< 10	0.13	< 1.0	< 0.050	< 0.50	< 20	< 0.30	26.8	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
CM_MW1-SH	2018 03 22	-	-	-	-	5.92	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	8.1	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.50	< 0.50
CM_MW1-SH	2018 11 21	-	-	-	-	5.53	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	< 5.0	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
CM_MW1-DP	2018 06 27	-	-	-	-	5.94	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	< 5.0	< 0.0050	< 0.0010	0.698	< 0.0010	< 0.0010	< 0.50	< 0.50
Trip Blank																								
LC_PIZP1101	2018 03 20	-	-	-	-	5.44	< 0.50	< 2.0	< 1.0	< 10	0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	6.8	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.50	-
LC_PIZP1101	2018 06 19	-	-	-	-	5.38	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	232	< 0.0050	< 0.0010	0.081	0.0022	< 0.0010	< 0.50	< 0.50
RG_DW-02-20	2018 02 13	-	-	-	-	5.47	< 0.5	< 2	< 1	< 3	< 0.1	< 1	< 0.05	< 0.1	< 20	< 0.3	< 5	< 0.005	< 0.001	< 0.05	< 0.001	< 0.002	< 0.5	-
EV_BCgw	2018 02 15	-	-	-	-	5.42	< 0.50	< 2.0	< 1.0	< 10	< 0.10	1.0	< 0.050	< 0.50	< 20	< 0.30	25.2	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.50	-
EV_OCgw	2018 02 21	-	-	-	-	5.40	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	21.3	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.50	-
EV_OCgw	2018 05 15	-	-	-	-	5.64	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	8.1	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.50	< 0.50
EV_OCgw	2018 08 20	-	-	-	-	5.85	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	94.1	< 0.0050	< 0.0010	0.103	< 0.0010	< 0.0020	< 0.50	-
EV_OCgw	2018 10 17	-	-	-	-	5.63	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 0.050	< 0.50	< 20	< 0.30	17.1	< 0.0050	< 0.0010	0.102	0.0011	0.0026	< 0.50	-

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n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.

RDL Denotes reported detection limit.

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.

[c] Standard to protect freshwater aquatic life.

[d] Guideline/standard varies with pH.

[e] Guideline/standard varies with hardness.

[f] Guideline/standard varies with chloride.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 5: Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Metals in Groundwater

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																														
		Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[k] µg/L
BC Guideline/Standard																																
BCWQG Aquatic Life Short-term Maximum (AW)[a]		28.7-100[d]	n/a	5	n/a	n/a	n/a	n/a	0.038-0.918[f]	n/a	n/a	110	3.2-16.5[f]	350 (max)	3-141[f]	n/a	n/a	815-2,237[f]	0.02[i]	2,000	n/a	n/a	n/a	0.1-3[f]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-81[f]
BCWQG Aquatic Life Long-Term Average (AW)[b]		9.6-50[d]	9	n/a	1,000	0.13	n/a	1,200	0.0176-0.291[f]	n/a	1 (Cr(+6))	4	2-6.2[f]	n/a	3-8.8[f]	n/a	n/a	767-1,283[f]	n/a	1,000	25-133[f]	n/a	2	0.05-1.5[f]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-55.5[f]
CSR Aquatic Life (AW)[c]		n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[f]	n/a	10[g]	40	20-90[f]	n/a	40-160[f]	n/a	n/a	n/a	0.25	10,000	250-1,500[f]	n/a	20	0.5-15[f]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[f]
CSR Irrigation Watering (IW)		5,000	n/a	100	n/a	100	n/a	500-6,000[e]	5	n/a	5[g]	50	200	5,000	200	2,500	n/a	200	1	10-30[j]	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	n/a
CSR Livestock Watering (LW)		5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[g]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)		9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[g]	20[h]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Background																																
FR_HMW5	2018 06 06	7.3	< 0.10	< 0.10	223	< 0.020	< 0.050	38	< 0.0050	42.0	< 0.10	< 0.10	< 0.50	< 10	< 0.050	177	20.9	51.2	< 0.00050	< 0.050	< 0.50	0.751	0.345	< 0.010	11.4	398	< 0.010	< 0.10	< 10	0.021	< 0.50	< 1.0
	2018 07 18	6.2	< 0.10	< 0.10	192	< 0.020	< 0.050	35	< 0.0050	39.8	< 0.10	< 0.10	< 0.50	< 10	< 0.050	160	19.3	46.9	< 0.00050	< 0.050	< 0.50	0.689	2.27	< 0.010	9.57	360	< 0.010	< 0.10	< 10	0.023	< 0.50	< 1.0
	2018 12 18	5.8	< 0.10	< 0.10	220	< 0.020	< 0.050	44	< 0.0050	42.4	< 0.10	< 0.10	< 0.50	15	< 0.050	176	20.9	49.4	< 0.00050	< 0.050	< 0.50	0.735	0.318	< 0.010	12.1	383	< 0.010	< 0.10	< 10	0.021	< 0.50	< 1.0
CM_MW3-SH	2018 03 27	< 3.0	< 0.10	0.12	82.7	< 0.020	< 0.050	28	0.0106	45.3	< 0.30	< 0.10	4.74	< 10	0.242	11.6	11.4	27.0	< 0.0050	1.39	0.59	0.794	0.275	< 0.010	5.95	260	< 0.010	< 0.10	< 10	0.253	< 0.50	50.4
	2018 06 25	< 3.0	< 0.10	0.10	84.6	< 0.020	< 0.050	19	0.0062	49.5	0.28	< 0.10	2.03	< 10	0.103	7.4	11.9	2.94	< 0.0050	1.02	0.68	0.678	0.219	< 0.010	4.14	278	< 0.010	< 0.10	< 10	0.211	< 0.50	27.7
	2018 09 20	< 3.0	< 0.10	0.10	86.6	< 0.020	< 0.050	23	0.0081	50.1	0.23	< 0.10	1.31	< 10	0.075	9.0	11.6	5.69	< 0.0050	0.907	< 0.50	0.712	0.286	< 0.010	4.02	267	< 0.010	< 0.10	< 10	0.222	< 0.50	16.9
	Duplicate	< 3.0	< 0.10	0.11	87.3	< 0.020	< 0.050	22	0.0086	50.5	0.23	< 0.10	1.32	< 10	0.076	8.2	12.1	5.78	< 0.0050	0.943	< 0.50	0.722	0.269	< 0.010	4.07	271	< 0.010	< 0.10	< 10	0.225	< 0.50	17.1
	QA/QC RPD%	*	*	*	1	*	*	*	*	1	*	*	*	*	*	9	4	2	*	4	*	1	6	*	1	1	*	*	*	1	*	1
	2018 11 15	< 3.0	< 0.10	0.11	85.2	< 0.020	< 0.050	22	0.0100	48.3	0.21	< 0.10	2.06	< 10	0.151	8.3	11.6	11.3	< 0.0050	1.02	0.52	0.689	0.239	< 0.010	4.04	289	< 0.010	< 0.10	< 10	0.225	< 0.50	34.8
CM_MW3-DP	2018 03 27	7.3	< 0.20	0.68	752	< 0.040	< 0.10	*534*	< 0.010	12.1	< 0.20	< 0.20	< 0.50	65	< 0.10	1,290	4.51	40.0	< 0.0050	3.37	2.0	2.29	< 0.10	< 0.020	571	1,090	< 0.020	< 0.20	< 10	0.370	< 1.0	6.4
	2018 06 25	9.4	< 0.20	0.71	761	< 0.040	< 0.10	469	< 0.010	11.7	< 0.20	< 0.20	0.75	29	< 0.10	1,220	4.62	42.0	< 0.0050	2.85	2.6	2.19	< 0.10	< 0.020	541	1,120	< 0.020	< 0.20	< 10	0.309	< 1.0	< 2.0
	Duplicate	5.9	< 0.20	0.62	780	< 0.040	< 0.10	472	< 0.010	11.8	< 0.20	< 0.20	0.76	30	< 0.10	1,230	4.70	41.4	< 0.0050	2.67	2.6	2.24	< 0.10	< 0.020	545	1,140	< 0.020	< 0.20	< 10	0.302	< 1.0	< 2.0
	QA/QC RPD%	*	*	14	2	*	*	1	*	1	*	*	*	*	*	1	2	1	*	7	0	2	*	*	1	2	*	*	*	2	*	*
	2018 09 20	6.0	< 0.10	0.71	755	< 0.020	< 0.050	491	0.0055	11.9	< 0.10	< 0.10	0.51	46	< 0.050	1,290	4.59	39.3	< 0.0050	2.48	2.12	2.27	0.35	< 0.010	554	1,040	< 0.010	< 0.10	< 10	0.356	< 0.50	5.1
	2018 11 15	6.2	< 0.20	0.66	730	< 0.040	< 0.10	473	< 0.010	11.0	< 0.20	< 0.20	< 0.50	42	< 0.10	1,130	4.77	37.8	< 0.0050	2.19	2.4	2.11	< 0.10	< 0.020	498	1,140	< 0.020	< 0.20	< 10	0.310	< 1.0	< 2.0
	Duplicate	5.1	< 0.20	0.65	705	< 0.040	< 0.10	475	< 0.010	11.0	< 0.20	< 0.20	< 0.50	38	< 0.10	1,120	4.34	36.3	< 0.0050	2.23	2.2	2.03	< 0.10	< 0.020	474	1,070	< 0.020	< 0.20	< 10	0.316	< 1.0	< 2.0
	QA/QC RPD%	*	*	2	3	*	*	< 1	*	0	*	*	*	*	*	1	9	4	*	2	*	4	*	*	5	6	*	*	*	2	*	*
GH_GA-MW-1	2018 03 13	6.4	1.82	0.62	47.1	< 0.020	< 0.050	*747*	0.0546	69.2	0.23	0.80	**134**	55	< 0.050	147	34.4	*301*	< 0.0050	9.21	3.76	3.77	0.093	< 0.010	182	4,340	0.046	< 0.10	< 10	2.70	< 0.50	17.7
	2018 05 17	< 3.0	1.89	0.63	44.0	< 0.020	< 0.050	*782*	0.0722	72.2	0.18	0.77	***245***	34	< 0.050	139	40.2	*356*	< 0.0050	9.30	5.33	4.09	0.11	< 0.010	170	4,440	0.046	< 0.10	< 10	2.40	< 0.50	23.5
	2018 08 27	< 3.0	0.76	0.63	43.7	< 0.020	< 0.050	*709*	0.0326	52.9	< 0.10	0.84	59.7	16	< 0.050	137	31.6	*217*	< 0.0050	8.75	3.97	3.49	0.095	< 0.010	161	4,040	0.040	< 0.10	< 10	1.92	< 0.50	6.8
	2018 11 21	< 3.0	0.56	0.47	46.7	< 0.020	< 0.050	*868*	0.0270	64.1	0.17	0.55	**108**	24	< 0.050	163	35.5	*231*	< 0.0050	6.22	4.13	3.30	0.208	< 0.010	161	4,710	0.032	< 0.10	< 10	1.89	< 0.50	46.4
Study Area 1																																
FR_09-01-A	2018 06 13	< 3.0	0.33	< 0.10	79.3	< 0.020	< 0.050	16	0.0286	143	< 0.10	< 0.10	16.4	< 10	< 0.050	47.9	67.1	< 0.10	< 0.0050	1.86	2.51	3.45	***106***	< 0.010	2.61	140	< 0.010	< 0.10	< 10	5.90	< 0.50	3.8
	2018 07 31	3.7	0.28	< 0.10	66.1	< 0.020	< 0.050	18	0.0251	125	0.27	< 0.10	4.90	< 10	< 0.050	47.1	61.2	< 0.10	< 0.0050	1.17	< 0.50	2.81	***81.2***	< 0.010	2.64	129	< 0.010	< 0.10	< 10	4.44	< 0.50	< 1.0
	2018 12 13	< 3.0	0.20	< 0.10	67.5	< 0.020	< 0.050	14	0.0525	131	0.14	0.44	< 0.50	< 10	< 0.050	41.5	56.3	< 0.10	< 0.0050	0.664	1.21	2.82	***38.1***	< 0.010	2.67	150	< 0.010	< 0.10	< 10	3.27	< 0.50	< 1.0
FR_09-01-B	2018 02 22	< 3.0	0.12	< 0.10	134	< 0.020	< 0.050	23	0.0414	159	0.16	0.47	< 0.50	< 10	< 0.050	65.0	77.4	< 0.10	< 0.0050	0.645	1.69	3.59	***53.5***	< 0.010	5.02	189	< 0.010	< 0.10	< 10	4.79	< 0.50	< 3.0
	Duplicate	< 3.0	0.12	< 0.10	137	< 0.020	< 0.050	21	0.0404	152	0.11	0.48	< 0.50	< 10	< 0.050	60.8	77.2	< 0.10	< 0.0050	0.675	1.71	3.64	***54.1***	< 0.010	5.11	194	< 0.010	< 0.10	< 10	4.89	< 0.50	< 3.0
	QA/QC RPD%	*	*	*	2	*	*	*	2	5	*	*	*	*	*	7	< 1	*	*	5	*	1	1	*	2	3	*	*	*	2	*	*
	2018 06 13	< 3.0	0.12	< 0.10	103	< 0.020	< 0.050	14	0.0177	125	< 0.10	< 0.10	< 0.50	< 10	< 0.050	44.6	57.9	< 0.10	< 0.0050	0.650	< 0.50	3.09	***97.1***	< 0.010	2.77	139	< 0.010	< 0.10	< 10	3.30	< 0.50	< 1.0
	2018 07 31	< 3.0	0.12	< 0.10	108	< 0.020	< 0.050	16	0.0278	130	0.13	0.12	< 0.50	< 10	< 0.050	50.9	63.2	< 0.10	< 0.0050	0.779	< 0.50	3.16	***79.4***	< 0.010	2.94	152	< 0.010	< 0.10	< 10	4.72	< 0.50	< 1.0
	2018 12 13	< 3.0	0.12	< 0.10	84.9	< 0.020	< 0.050	14	0.0289	110	0.11	0.18	< 0.50	< 10	< 0.050	37.6	48.0	< 0.10	< 0.0050	0.833	0.50	2.77	***41.8***	< 0.010	2.00	124	< 0.010	< 0.10	< 10	2.66	< 0.50	< 1.0
FR_GH_WELL4	2018 01 31	< 3.0	< 0.10	< 0.10	99.7	< 0.020	< 0.050	10	0.0468	157	< 0.10	< 0.10	1.59	14	0.079	23.4	65.4	1.42	< 0.0050	0.320	< 0.50	1.30	***109***	< 0.010	2.78	214	< 0.010	< 0.10	< 10	2.94	< 0.50	21.2
	2018 06 14	< 3.0	< 0.10	< 0.10	84.0	< 0.020	< 0.050	11	0.0382	134	< 0.10	< 0.10	2.04	24	0.058	26.0	56.4	2.77	< 0.0050	0.361	< 0.50	1.43	***77***	< 0.010	2.53	177	< 0.010	< 0.10	< 10	2.78	< 0.50	18.2
	2018 07 31	< 3.0	< 0.10	< 0.10	73.9	< 0.020	< 0.050	11	0.0342	117	< 0.10	< 0.10	2.22	11	0.430	22.7	48.2	0.70	< 0.0050	0.333	< 0.50	1.35	***76.9***	< 0.010	2.31	159	< 0.010	< 0.10	< 10	2.43	< 0.50	28.3
	2018 12 13	< 3.0	< 0.10	< 0.10	90.0	< 0.020	< 0.050	12	0.0388	163	< 0.10	0.10	2.20	28	0.100	28.9	63.3	2.25	< 0.0050	0.323	< 0.50	1.47	***99.2***	< 0.010	2.68	210	< 0.010	< 0.10	< 10	3.11	< 0.50	85.9
GH_MW-PC	2018 03 28	3.1	< 0.20	< 0.20	91.3	< 0.040	< 0.10	< 20	0.035	101	< 0.20	< 0.20	35.7	21	< 0.10	5.9	76.5	0.44	< 0.0050	2.76	< 1.0	0.81	***61.3***	< 0.020	0.90	138	< 0.020	< 0.20	< 10	4.52	< 1.0	4.1
	2018 06 19	5.9	< 0.20	< 0.20	105	< 0.040	< 0.10	< 20	0.028	124	*5.60*	< 0.20	28.0	< 20	< 0.10	8.1	87.2	0.85	< 0.0050	2.86	1.3	1.05	***84***	< 0.020	0.97	149	< 0.020	< 0.20	< 10	5.46	< 1.0	2.5
	2018 08 20	< 3.0	< 0.10	0.21	106	< 0.020	< 0.050	< 10	0.0536	123	0.28	< 0.10	***542***	< 10	< 0.050	9.5	83.0	0.57	< 0.0050	2.66	0.75	1.26	***65.7***	< 0.010	1.01	149	< 0.010	< 0.10	< 10	5.10	< 0.50	3.5
	Duplicate	< 3.0	< 0.10	0.21	107	< 0.020	< 0.050	< 10	0.0516	124	0.30	< 0.10	***566***	< 10	< 0.050	9.3	82.6	0.52	< 0.0050	2.67	0.71	1.27	***65.9***	< 0.010	1.01	153	< 0.010	< 0.10	< 10	5.17	< 0.50	2.8
	QA/QC RPD%	*	*	*	1	*	*	*	4	1	*	*	4	*	*	2	< 1	9	*	< 1	*	1	< 1	*	0	3	*	*	*	1	*	*
	2018 12 12	< 3.0	< 0.10	0.15	97.8	< 0.020	< 0.050	< 10	0.0353	121	0.38	< 0.10	**183**	< 10	< 0.050	7.2	78.9	0.25	0.0096	2.35	0.59	0.914	***70.3***	< 0.010	0.898	143	< 0.010	< 0.10	< 10	4.38	< 0.50	2.2

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.
RDL Denotes reported detection limit.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[c] Standard to protect freshwater aquatic life.
[d] Guideline/standard varies with pH.
[e] Standard varies with crop.
[f] Guideline/standard varies with hardness.
[g] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[h] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[i] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg
[j] Standard ranges between 10 to 30 ug/L and varies with crop, soil drainage and Mo:Cu ratio. Conservative standard of 10 ug/L was applied.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

TABLE 5 (Cont'd): Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Metals in Groundwater

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																														
		Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[k] µg/L
BC Guideline/Standard																																
BCWQG Aquatic Life Short-term Maximum (AW)[a]		28.7-100[d]	n/a	5	n/a	n/a	n/a	n/a	0.038-0.918[f]	n/a	n/a	110	3.2-16.5[f]	350 (max)	3-141[f]	n/a	n/a	815-2,237[f]	0.02[i]	2,000	n/a	n/a	n/a	0.1-3[f]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-81[f]
BCWQG Aquatic Life Long-Term Average (AW)[b]		9.6-50[d]	9	n/a	1,000	0.13	n/a	1,200	0.0176-0.291[f]	n/a	1 (Cr(+6))	4	2-6.2[f]	n/a	3-8.8[f]	n/a	n/a	767-1,283[f]	n/a	1,000	25-133[f]	n/a	2	0.05-1.5[f]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-55.5[f]
CSR Aquatic Life (AW)[c]		n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[f]	n/a	10[g]	40	20-90[f]	n/a	40-160[f]	n/a	n/a	n/a	0.25	10,000	250-1,500[f]	n/a	20	0.5-15[f]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[f]
CSR Irrigation Watering (IW)		5,000	n/a	100	n/a	100	n/a	500-6,000[e]	5	n/a	5[g]	50	200	5,000	200	2,500	n/a	200	1	10-30[j]	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	n/a
CSR Livestock Watering (LW)		5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[g]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)		9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[g]	20[h]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Study Area 2																																
LC_PIZDC1308	2018 03 07	< 3.0	< 0.10	0.50	481	< 0.020	< 0.050	15	< 0.0050	68.1	< 0.10	1.38	< 0.50	1,200	< 0.050	25.9	24.2	110	< 0.0050	8.49	2.94	3.03	< 0.050	< 0.010	8.34	108	0.034	< 0.10	< 10	0.703	< 0.50	< 3.0
	Duplicate	< 3.0	< 0.10	0.47	480	< 0.020	< 0.050	14	< 0.0050	68.1	< 0.10	1.35	< 0.50	1,220	< 0.050	25.5	24.5	111	< 0.0050	8.44	2.94	3.03	< 0.050	< 0.010	8.28	111	0.033	< 0.10	< 10	0.675	< 0.50	< 3.0
	QA/QC RPD%	*	*	*	< 1	*	*	*	*	0	*	2	*	2	1	1	*	1	0	0	*	*	*	1	3	*	*	*	4	*	*	
	2018 06 13	< 3.0	< 0.10	< 0.10	277	< 0.020	< 0.050	10	0.116	98.0	< 0.10	0.27	< 0.50	< 10	< 0.050	8.7	29.5	4.29	< 0.0050	1.77	1.35	2.06	0.16	< 0.010	1.72	102	0.019	< 0.10	< 10	1.47	< 0.50	1.7
	2018 08 29	< 3.0	< 0.10	< 0.10	321	< 0.020	< 0.050	11	0.127	92.0	< 0.10	0.69	< 0.50	< 10	< 0.050	9.7	27.2	35.6	< 0.0050	2.34	1.54	2.16	0.098	< 0.010	2.08	108	0.023	< 0.10	< 10	1.59	< 0.50	2.1
	2018 11 27	< 3.0	< 0.10	0.18	506	< 0.020	< 0.050	12	0.0211	85.2	< 0.10	1.61	< 0.50	< 10	< 0.050	12.2	29.2	102	< 0.0050	3.76	3.25	2.76	0.058	< 0.010	2.84	116	0.039	< 0.10	< 10	1.12	< 0.50	1.6
LC_PIZDC1307	2018 03 07	< 3.0	< 0.10	1.31	1,550	< 0.020	< 0.050	24	< 0.015	41.9	< 0.10	< 0.10	< 0.50	785	< 0.050	77.4	21.6	9.82	< 0.0050	*33.8*	0.77	5.41	< 0.050	< 0.010	14.5	139	< 0.010	< 0.10	< 10	0.051	< 0.50	< 3.0
	2018 06 13	4.0	< 0.10	1.45	1,410	< 0.020	< 0.050	22	< 0.030	35.3	< 0.10	< 0.10	0.50	917	< 0.050	78.7	21.4	8.47	< 0.0050	*33.4*	0.70	5.49	< 0.050	< 0.010	14.6	133	< 0.010	< 0.10	< 10	0.032	< 0.50	1.8
	2018 08 29	< 3.0	< 0.10	0.66	1,430	< 0.020	< 0.050	22	< 0.015	38.5	< 0.10	< 0.10	0.51	< 10	< 0.050	82.3	19.5	9.27	< 0.0050	*33.8*	0.64	5.60	< 0.050	< 0.010	14.6	144	< 0.010	< 0.10	< 10	0.046	< 0.50	1.2
	2018 11 26	< 3.0	< 0.10	0.65	1,480	< 0.020	< 0.050	22	< 0.010	38.9	< 0.10	< 0.10	< 0.50	< 10	< 0.050	75.9	21.4	7.17	< 0.0050	*32.4*	0.65	5.23	< 0.050	< 0.010	13.6	134	< 0.010	< 0.10	< 10	0.030	< 0.50	< 1.0
Study Area 3																																
GH_POTW09	2018 03 13	< 3.0	< 0.10	0.43	32.5	< 0.020	< 0.050	25	0.0098	98.5	< 0.10	0.18	1.63	138	< 0.050	11.7	39.2	178	< 0.0050	2.25	3.21	1.53	1.04	< 0.010	6.57	333	0.017	< 0.10	< 10	1.90	< 0.50	4.3
	2018 06 04	< 3.0	< 0.10	0.39	30.6	< 0.020	< 0.050	17	0.0104	90.4	< 0.10	0.16	2.73	136	0.059	10.8	38.1	176	< 0.0050	2.32	1.88	1.41	1.69	< 0.010	6.09	302	0.017	< 0.10	< 10	2.14	< 0.50	4.3
	2018 09 17	< 3.0	0.81	0.24	39.0	< 0.020	< 0.050	11	0.0074	162	< 0.10	< 0.10	< 0.50	< 10	< 0.050	19.4	169	0.26	< 0.0050	3.00	17.4	2.56	***185***	< 0.010	2.74	181	0.010	< 0.10	< 10	7.76	< 0.50	< 1.0
	2018 10 16	< 3.0	< 0.10	0.48	34.9	< 0.020	< 0.050	19	0.0114	96.5	< 0.10	0.18	2.94	150	< 0.050	11.5	40.3	186	< 0.0050	2.43	1.85	1.61	3.39	< 0.010	6.74	338	0.019	< 0.10	< 10	2.45	< 0.50	6.5
GH_POTW10	2018 03 06	< 3.0	< 0.10	1.23	19.3	< 0.020	< 0.050	34	0.0083	86.9	0.11	0.16	< 0.50	785	< 0.050	14.2	40.9	51.9	< 0.0050	2.51	1.59	1.71	4.55	< 0.010	5.09	509	< 0.010	< 0.10	< 10	0.654	< 0.50	< 3.0
	2018 06 11	< 3.0	< 0.10	1.81	21.5	< 0.020	< 0.050	33	0.0119	97.6	< 0.10	0.17	< 0.50	822	< 0.050	16.4	44.3	56.2	< 0.0050	2.91	1.21	1.80	2.45	< 0.010	5.34	559	< 0.010	< 0.10	< 10	0.721	< 0.50	2.7
	2018 08 29	< 3.0	< 0.10	1.16	18.3	< 0.020	< 0.050	34	0.0061	88.2	< 0.10	0.16	< 0.50	789	0.070	15.4	42.5	54.9	< 0.0050	2.71	3.14	1.78	2.73	< 0.010	5.12	495	< 0.010	< 0.10	< 10	0.696	< 0.50	1.6
	Duplicate	< 3.0	< 0.10	1.07	18.3	< 0.020	< 0.050	33	< 0.0050	86.0	< 0.10	0.15	< 0.50	837	0.131	15.4	42.6	52.6	< 0.0050	2.72	8.70	1.68	2.61	< 0.010	4.92	504	< 0.010	< 0.10	< 10	0.699	< 0.50	3.9
	QA/QC RPD%	*	*	8	0	*	*	*	*	3	*	*	*	6	*	0	< 1	4	*	< 1	94	6	4	*	4	2	*	*	*	0	*	*
	2018 10 04	< 3.0	< 0.10	1.06	18.1	< 0.020	< 0.050	34	0.0097	92.3	< 0.10	0.15	< 0.50	641	< 0.050	15.4	43.7	51.8	< 0.0050	2.80	1.01	1.65	2.82	< 0.010	4.94	502	< 0.010	< 0.10	< 10	0.689	< 0.50	< 1.0
GH_POTW15	2018 03 06	3.3	< 0.10	1.69	22.5	< 0.020	< 0.050	19	0.0249	118	< 0.10	0.25	< 0.50	808	< 0.050	13.1	42.7	197	< 0.0050	2.12	1.14	1.58	0.152	< 0.010	11.4	367	0.017	< 0.10	< 10	1.30	< 0.50	< 3.0
	2018 06 11	< 3.0	< 0.10	1.92	28.0	< 0.020	< 0.050	19	0.0186	146	< 0.10	0.29	< 0.50	970	< 0.050	15.8	53.1	*226*	< 0.0050	2.48	1.38	1.81	< 0.050	< 0.010	14.3	439	0.018	< 0.10	< 10	1.56	< 0.50	1.3
	2018 08 29	< 3.0	< 0.10	1.66	22.5	< 0.020	< 0.050	19	0.0096	127	< 0.10	0.23	< 0.50	815	< 0.050	14.6	46.8	190	< 0.0050	2.40	1.21	1.60	< 0.050	< 0.010	11.7	373	0.016	< 0.10	< 10	1.45	< 0.50	< 1.0
	2018 10 04	< 3.0	< 0.10	1.63	22.2	< 0.020	< 0.050	20	0.0133	135	< 0.10	0.22	< 0.50	883	< 0.050	14.6	50.0	191	< 0.0050	2.36	1.14	1.66	< 0.050	< 0.010	12.0	384	0.017	< 0.10	< 10	1.37	< 0.50	1.3
GH_POTW17	2018 03 06	< 3.0	< 0.10	0.14	27.4	< 0.020	< 0.050	24	0.0509	172	< 0.10	0.14	< 0.50	155	0.206	12.8	70.6	76.2	< 0.0050	0.969	12.8	1.72	7.76	< 0.010	8.18	493	0.013	< 0.10	< 10	2.07	< 0.50	< 3.0
	Duplicate	< 3.0	< 0.10	0.15	28.1	< 0.020	< 0.050	23	0.0444	166	< 0.10	0.14	< 0.50	128	0.138	12.5	71.1	76.9	< 0.0050	1.00	13.1	1.75	7.96	< 0.010	8.45	500	0.013	< 0.10	< 10	2.10	< 0.50	< 3.0
	QA/QC RPD%	*	*	*	3	*	*	*	14	4	*	*	*	19	*	2	1	1	*	3	2	2	3	*	3	1	*	*	*	1	*	*
	2018 06 04	< 3.0	< 0.10	0.14	31.2	< 0.020	< 0.050	21	0.0444	175	< 0.10	0.17	1.82	< 10	< 0.050	13.1	79.4	69.5	< 0.0050	1.10	33.3	1.69	13.2	< 0.010	8.56	462	0.015	< 0.10	< 10	2.42	< 0.50	4.3
	Duplicate	< 3.0	< 0.10	0.17	30.2	< 0.020	< 0.050	22	0.0436	182	< 0.10	0.14	< 0.50	152	0.343	13.3	75.0	63.9	< 0.0050	1.05	17.2	1.64	13.5	< 0.010	8.06	455	0.013	< 0.10	< 10	2.35	< 0.50	1.9
	QA/QC RPD%	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	*	*	*	*	*	*	2	*	*	*	*	*	*	*	*	*	*
	2018 08 30	< 3.0	< 0.10	0.20	27.9	< 0.020	< 0.050	22	0.0477	162	< 0.10	0.15	< 0.50	224	0.408	14.8	67.8	72.9	< 0.0050	1.17	13.6	1.58	9.42	< 0.010	7.84	462	0.011	< 0.10	< 10	2.25	< 0.50	3.6
	2018 10 16	< 3.0	< 0.10	0.11	32.8	< 0.020	< 0.050	22	0.0440	173	< 0.10	0.11	< 0.50	141	1.85	13.0	69.5	43.2	< 0.0050	1.06	50.0	1.72	7.3	< 0.010	8.23	451	0.014	< 0.10	< 10	2.53	< 0.50	7.3
	Duplicate	-	-	-	-	-	-	-	-	177	-	-	-	-	-	-	76.3	-	< 0.0050	-	-	1.59	-	-	8.91	-	-	-	-	-	-	-
	QA/QC RPD%	*	*	*	*	*	*	*	*	2	*	*	*	*	*	*	9	*	*	*	*	8	*	*	8	*	*	*	*	*	*	*
GH_MW-RLP-1D	2018 03 06	5.3	< 0.10	0.15	49.6	< 0.020	< 0.050	15	< 0.0050	40.0	< 0.10	< 0.10	< 0.50	34	< 0.050	6.2	28.3	1.95	< 0.050	0.132	< 0.50	1.30	4.26	< 0.010	4.65	186	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
	2018 05 31	7.9	< 0.10	0.15	48.5	< 0.020	< 0.050	15	< 0.0050	37.9	0.14	< 0.10	< 0.50	21	< 0.050	7.4	30.1	3.63	< 0.0050	0.094	< 0.50	1.28	1.61	< 0.010	4.75	185	< 0.010	< 0.10	< 10	< 0.010	< 0.50	5.5
	2018 09 17	< 3.0	< 0.10	< 0.10	13.1	< 0.020	< 0.050	16	< 0.0050	21.2	< 0.10	< 0.10	< 0.50	< 10	< 0.050	7.5	26.0	8.24	< 0.0050	0.424	< 0.50	1.33	< 0.050	< 0.010	4.40	122	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
	2018 11 29	< 3.0	< 0.10	< 0.10	16.2	< 0.020	< 0.050	17	< 0.0050	14.7	< 0.10	< 0.10	< 0.50	42	< 0.050	7.1	29.4	8.54	< 0.0050	0.380	< 0.50	1.44	< 0.050	< 0.010	4.56	102	< 0.010	< 0.10	< 10	< 0.010	< 0.50	1.7

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.
RDL Denotes reported detection limit.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[c] Standard to protect freshwater aquatic life.
[d] Guideline/standard varies with pH.
[e] Standard varies with crop.
[f] Guideline/standard varies with hardness.
[g] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[h] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[i] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg
[j] Standard ranges between 10 to 30 ug/L and varies with crop, soil drainage and Mo:Cu ratio. Conservative standard of 10 ug/L was applied.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

TABLE 5 (Cont'd): Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Metals in Groundwater

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																														
		Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[k] µg/L
BC Guideline/Standard																																
BCWQG Aquatic Life Short-term Maximum (AW)[a]		28.7-100[d]	n/a	5	n/a	n/a	n/a	n/a	0.038-0.918[f]	n/a	n/a	110	3.2-16.5[f]	350 (max)	3-141[f]	n/a	n/a	815-2,237[f]	0.02[i]	2,000	n/a	n/a	n/a	0.1-3[f]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-81[f]
BCWQG Aquatic Life Long-Term Average (AW)[b]		9.6-50[d]	9	n/a	1,000	0.13	n/a	1,200	0.0176-0.291[f]	n/a	1 (Cr(+6))	4	2-6.2[f]	n/a	3-8.8[f]	n/a	n/a	767-1,283[f]	n/a	1,000	25-133[f]	n/a	2	0.05-1.5[f]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-55.5[f]
CSR Aquatic Life (AW)[c]		n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[f]	n/a	10[g]	40	20-90[f]	n/a	40-160[f]	n/a	n/a	n/a	0.25	10,000	250-1,500[f]	n/a	20	0.5-15[f]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[f]
CSR Irrigation Watering (IW)		5,000	n/a	100	n/a	100	n/a	500-6,000[e]	5	n/a	5[g]	50	200	5,000	200	2,500	n/a	200	1	10-30[j]	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	n/a
CSR Livestock Watering (LW)		5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[g]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)		9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[g]	20[h]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Study Area 4																																
GH_MW-ERSC-1	2018 03 06	< 3.0	< 0.10	0.12	206	< 0.020	< 0.050	10	0.0747	166	0.19	< 0.10	1.55	< 10	< 0.050	12.1	62.8	4.06	< 0.0050	1.35	1.03	1.01	***68.1***	< 0.010	6.57	611	0.029	< 0.10	< 10	1.80	< 0.50	< 3.0
	2018 05 16	< 3.0	0.10	0.14	82.6	< 0.020	< 0.050	< 10	0.0185	66.1	0.21	< 0.10	0.91	< 10	< 0.050	7.5	22.6	5.61	< 0.0050	2.05	0.73	0.839	7.47	< 0.010	3.14	205	0.014	< 0.10	< 10	0.858	< 0.50	1.1
	Duplicate	< 3.0	< 0.10	0.13	81.6	< 0.020	< 0.050	< 10	0.0219	63.1	0.19	< 0.10	0.81	< 10	< 0.050	7.1	21.9	5.27	< 0.0050	2.10	0.73	0.834	7.75	< 0.010	3.05	192	0.015	< 0.10	< 10	0.871	< 0.50	< 1.0
	QA/QC RPD%	*	*	*	1	*	*	*	*	5	*	*	*	*	*	5	3	6	*	2	*	1	4	*	3	7	*	*	*	2	*	*
	2018 09 12	< 3.0	0.11	0.24	142	< 0.020	< 0.050	14	0.0459	89.5	0.20	< 0.10	3.08	< 10	< 0.050	7.6	25.8	6.95	< 0.0050	3.32	1.07	0.873	1.09	< 0.010	3.75	246	0.033	< 0.10	< 10	0.848	< 0.50	1.9
	2018 10 17	< 3.0	0.10	0.24	134	< 0.020	< 0.050	13	0.0497	84.5	0.15	< 0.10	4.62	19	< 0.050	7.5	24.4	6.81	< 0.0050	4.35	1.56	0.753	0.73	< 0.010	3.67	237	0.039	< 0.10	< 10	0.803	< 0.50	1.9
	Duplicate	-	-	-	-	-	-	-	-	88.7	-	-	-	-	-	-	24.5	-	< 0.0050	-	-	0.827	-	-	3.95	-	-	-	-	-	-	-
	QA/QC RPD%	*	*	*	*	*	*	*	*	5	*	*	*	*	*	*	< 1	*	*	*	*	9	*	*	7	*	*	*	*	*	*	*
GH_GA-MW-2	2018 03 21	< 3.0	0.65	0.18	76.7	< 0.020	< 0.050	23	0.0660	150	< 0.10	< 0.10	11.5	< 10	< 0.050	18.5	44.0	3.49	< 0.0050	2.45	2.55	1.25	***43.1***	< 0.010	10.5	561	0.016	< 0.10	< 10	2.41	< 0.50	4.4
	2018 05 17	< 3.0	2.37	0.24	57.9	< 0.020	< 0.050	21	< 0.080	128	2.63	0.37	9.14	11	< 0.050	16.1	38.0	71.8	< 0.0050	*68.6*	6.40	1.14	8.78	< 0.010	8.71	509	0.010	< 0.10	< 10	5.11	< 0.50	7.1
	2018 09 12	< 3.0	2.07	0.25	54.9	< 0.020	< 0.050	18	< 0.060	123	< 0.10	0.34	5.61	< 10	< 0.050	16.2	36.9	70.3	< 0.0050	*63.3*	5.22	1.14	13.5	< 0.010	9.15	531	< 0.010	< 0.10	< 10	5.80	< 0.50	7.1
	2018 11 26	< 10	2.2	< 1.0	51.4	< 0.20	< 0.50	< 100	0.072	148	< 1.0	< 1.0	7.1	< 100	< 0.50	18	41.2	100	< 0.0050	*71.3*	6.7	1.23	11.3	< 0.10	9.82	590	< 0.10	< 1.0	< 10	6.90	< 5.0	< 10
GH_GA-MW-3	2018 03 07	< 3.0	< 0.10	< 0.10	107	< 0.020	< 0.10	237	< 0.0050	43.1	0.27	< 0.10	< 0.50	13	< 0.050	94.4	30.1	8.91	< 0.050	< 0.050	< 0.50	2.44	< 0.10	< 0.010	36.2	2,210	< 0.010	< 0.10	< 10	0.036	< 0.50	< 3.0
	2018 05 16	< 3.0	0.14	0.11	69.4	< 0.020	< 0.050	25	0.0164	129	< 0.10	0.20	< 0.50	99	< 0.050	21.1	66.0	67.9	< 0.0050	1.34	2.61	1.48	***49.2***	< 0.010	8.12	669	< 0.010	< 0.10	< 10	1.67	< 0.50	6.3
	2018 09 12	3.6	< 0.10	< 0.10	85.8	< 0.020	< 0.050	221	< 0.0050	44.0	0.12	< 0.10	< 0.50	< 10	< 0.050	90.5	32.4	9.77	< 0.10	< 0.050	< 0.50	2.37	3.38	< 0.010	35.5	2,050	< 0.010	< 0.10	< 10	0.068	< 0.50	< 1.0
	2018 11 26	< 3.0	< 0.10	< 0.10	91.0	< 0.020	< 0.050	276	< 0.0050	46.5	< 0.10	< 0.10	< 0.50	< 10	< 0.050	96.9	33.7	6.98	< 0.10	< 0.050	< 0.50	2.43	10.3	< 0.010	37.2	2,330	< 0.010	< 0.10	< 10	0.047	< 0.50	< 1.0
GH_GA-MW-4	2018 03 21	< 3.0	0.15	0.10	68.8	< 0.020	< 0.050	17	0.0062	53.4	0.38	< 0.10	1.26	< 10	< 0.050	22.4	23.6	< 0.10	< 0.0050	2.39	< 0.50	1.16	2.23	< 0.010	6.02	178	< 0.010	< 0.10	< 10	1.65	< 0.50	< 3.0
	2018 05 17	< 3.0	0.17	< 0.10	70.9	< 0.020	< 0.050	< 20	0.0082	60.8	0.18	< 0.10	1.74	< 10	< 0.050	21.8	25.7	< 0.10	< 0.0050	2.16	< 0.50	1.05	4.95	< 0.010	5.58	190	< 0.010	< 0.10	< 10	1.61	< 0.50	< 1.0
	2018 08 27	< 3.0	0.16	0.12	74.7	< 0.020	< 0.050	15	0.0114	44.6	0.17	< 0.10	2.10	< 10	0.060	18.3	21.6	0.15	< 0.0050	2.11	< 0.50	1.17	2.51	< 0.010	5.27	172	< 0.010	< 0.10	< 10	1.63	< 0.50	6.0
	2018 11 21	< 3.0	0.15	< 0.10	76.7	< 0.020	< 0.050	15	0.0067	50.6	0.17	< 0.10	0.62	< 10	< 0.050	18.8	20.7	< 0.10	< 0.0050	1.91	< 0.50	1.02	2.61	< 0.010	5.71	179	< 0.010	< 0.10	< 10	1.47	< 0.50	< 1.0
RG_DW-01-03	2018 02 26	< 3.0	< 0.10	< 0.10	81.6	< 0.020	< 0.050	< 10	0.0121	57.8	< 0.30	< 0.10	3.19	< 10	0.367	2.4	13.4	< 0.10	< 0.0050	0.841	< 0.50	0.427	2.45	< 0.010	1.45	208	< 0.010	< 0.10	< 10	0.768	< 0.50	39.9
	2018 04 30	< 3.0	< 0.10	< 0.10	73.4	< 0.020	< 0.050	< 10	0.0084	50.2	0.27	< 0.10	1.32	< 10	0.143	2.4	13.7	< 0.10	< 0.0050	0.998	< 0.50	0.452	3.25	< 0.010	1.43	203	< 0.010	< 0.10	< 10	0.805	< 0.50	9.5
	2018 09 25	< 3.0	< 0.10	< 0.10	72.2	< 0.020	< 0.050	< 10	0.0061	52.0	0.24	< 0.10	1.05	< 10	< 0.050	2.3	13.4	< 0.10	< 0.0050	0.921	< 0.50	0.415	3.46	< 0.010	1.34	201	< 0.010	< 0.10	< 10	0.791	< 0.50	6.0
	2018 11 26	< 3.0	< 0.10	< 0.10	71.6	< 0.020	< 0.050	< 10	0.0082	53.8	0.24	< 0.10	0.75	< 10	0.053	2.3	13.1	< 0.10	< 0.0050	0.940	< 0.50	0.410	2.98	< 0.010	1.32	209	< 0.010	< 0.10	< 10	0.797	< 0.50	5.9
RG_DW-01-07	2018 02 26	< 3.0	< 0.10	< 0.10	137	< 0.020	< 0.050	18	0.0463	115	< 0.20	< 0.10	2.62	< 10	0.082	6.8	41.5	0.29	< 0.0050	3.31	< 0.50	0.975	1.97	< 0.010	6.34	291	< 0.010	< 0.10	< 10	1.35	< 0.50	9.8
	2018 04 30	< 3.0	< 0.10	< 0.10	132	< 0.020	< 0.050	18	0.0524	125	0.15	< 0.10	1.99	< 10	0.067	7.7	46.1	0.11	< 0.0050	3.93	< 0.50	1.11	1.66	< 0.010	9.53	329	< 0.010	< 0.10	< 10	1.67	< 0.50	8.1
	2018 09 25	< 3.0	< 0.10	< 0.10	122	< 0.020	< 0.050	18	0.0434	109	0.20	< 0.10	1.00	< 10	< 0.050	6.8	38.6	0.15	< 0.0050	3.64	< 0.50	0.908	1.82	< 0.010	5.39	288	< 0.010	< 0.10	< 10	1.66	< 0.50	4.7
	2018 11 26	< 3.0	< 0.10	< 0.10	117	< 0.020	< 0.050	20	0.0421	115	0.19	< 0.10	6.04	15	1.03	6.7	39.4	0.35	< 0.0050	3.84	0.72	0.903	2.09	< 0.010	5.10	297	< 0.010	< 0.10	< 10	1.68	< 0.50	28.9
Study Area 5/6																																
LC_PIZP1101	2018 03 20	< 3.0	< 0.10	1.23	463	< 0.020	< 0.10	20	< 0.0050	28.2	< 0.10	0.24	< 0.50	240	< 0.050	9.9	14.2	*242*	< 0.0050	*10.8*	< 0.50	0.729	< 0.050	< 0.010	17.2	204	< 0.010	< 0.10	< 10	1.32	< 0.50	< 3.0
	2018 06 19	< 3.0	< 0.10	1.26	497	< 0.020	< 0.050	19	< 0.0050	28.6	< 0.10	0.24	< 0.50	211	< 0.050	9.6	15.6	*245*	< 0.0050	*12.1*	< 0.50	0.805	< 0.050	< 0.010	19.0	209	< 0.010	< 0.10	< 10	1.44	< 0.50	< 1.0
	2018 09 13	< 3.0	< 0.10	0.85	453	< 0.020	< 0.050	19	0.0155	29.0	< 0.10	0.23	< 0.50	< 10	< 0.050	9.3	13.5	*208*	< 0.0050	*12.8*	< 0.50	0.712	< 0.050	< 0.010	18.1	212	0.014	< 0.10	< 10	1.71	< 0.50	< 1.0
	2018 11 16	< 3.0	< 0.10	0.96	481	< 0.020	< 0.050	22	0.0113	27.5	< 0.10	0.23	< 0.50	< 10	< 0.050	10.0	15.4	*238*	< 0.0050	*11.4*	< 0.50	0.770	< 0.050	< 0.020	18.3	215	< 0.010	< 0.10	< 10	1.52	< 0.50	< 1.0
Study Area 7																																
EV_GV3gw	2018 02 20	< 3.0	< 0.10	< 0.10	17.5	< 0.020	< 0.050	12	0.0084	86.0	0.23	< 0.10	< 0.50	< 10	< 0.050	16.0	33.6	0.10	< 0.0050	0.886	< 0.50	0.987	3.92	< 0.010	3.41	587	< 0.010	< 0.10	< 10	1.64	< 0.50	< 3.0
	2018 05 29	3.3	< 0.10	< 0.10	18.8	< 0.020	< 0.050	12	0.0081	86.1	0.17	< 0.10	< 0.50	< 10	< 0.050	14.8	34.2	0.11	< 0.0050	0.991	< 0.50	1.04	4.09	< 0.010	3.40	573	< 0.010	< 0.10	< 10	1.85	< 0.50	< 1.0
	2018 08 21	< 3.0	< 0.10	< 0.10	17.3	< 0.020	< 0.050	11	0.0088	80.2	0.21	< 0.10	< 0.50	< 10	< 0.050	15.2	32.9	< 0.10	< 0.0050	0.927	< 0.50	0.998	4.36	< 0.010	3.25	527	< 0.010	< 0.10	< 10	1.71	< 0.50	< 1.0
	2018 10 18	< 3.0	< 0.10	< 0.10	17.8	< 0.020	< 0.050	12	0.0081	77.8	0.24	< 0.10	< 0.50	< 10	< 0.050	15.1	32.5	0.60	< 0.0050	0.986	< 0.50	0.984	4.34	< 0.010	3.20	555	< 0.010	< 0.10	< 10	1.62	< 0.50	< 1.0
RG_DW-02-20	2018 02 13	< 3.0	< 0.10	< 0.10	88.8	< 0.020	< 0.050	< 10	0.0060	71.4	0.19	< 0.10	3.11	< 10	< 0.050	6.4	19.2	3.39	< 0.0050	1.02	< 0.50	0.596	12.3	< 0.010	2.50	241	< 0.010	< 0.10	< 10	0.980	< 0.50	7.1
	Duplicate	< 3.0	< 0.10	< 0.10	91.7	< 0.020	< 0.050	< 10	0.0070	72.5	0.24	< 0.10	4.58	11	0.071	6.4	19.3	3.39	< 0.0050	1.01	< 0.50	0.589	12.5	< 0.010	2.62	250	< 0.010	< 0.10	< 10	0.987	< 0.50	11.2
	QA/QC RPD%	*	*	*	3	*	*	*	*	2	*	*	38	*	*	0	1	0	*	1	*	1	2	*	5	4	*	*	*	1	*	45
	2018 04 25	< 3.0	< 0.10	< 0.10	97.1	< 0.020	< 0.050	< 10	0.0069	67.1	0.12	< 0.10	6.25	< 10	0.143	6.4	20.0	1.31	< 0.0050	1.01	< 0.50	0.589	12.8	< 0.010	2.53	248	< 0.010	< 0.10	< 10	1.06	< 0.50	8.9
	2018 09 26	< 3.0	< 0.10	< 0.10	87.7	< 0.020	< 0.050	< 10	0.0075	60.5	0.27	< 0.10	5.00	< 10	0.113	6.3	18.1	0.37	< 0.0050	1.15	< 0.50	0.623	9.87	< 0.010	2.36	229	< 0.010	< 0.10	< 10	1.05	< 0.50	6.2
	2018 11 26	< 3.0	< 0.10	< 0.10	86.7	< 0.020	< 0.050	< 10	0.0094	62.3	0.21	< 0.10	1.00	< 10	< 0.050	6.7	18.5	0.85	< 0.0050	1.11	< 0.50	0.591	9.83	< 0.010	2.39	225	< 0.010	< 0.10	< 10	1.01	< 0.50	2.0

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.
RDL Denotes reported detection limit.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[c] Standard to protect freshwater aquatic life.
[d] Guideline/standard varies with pH.
[e] Standard varies with crop.
[f] Guideline/standard varies with hardness.
[g] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[h] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[i] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg
[j] Standard ranges between 10 to 30 ug/L and varies with crop, soil drainage and Mo:Cu ratio. Conservative standard of 10 ug/L was applied.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

TABLE 5 (Cont'd): Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Metals in Groundwater

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																														
		Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[k] µg/L
BC Guideline/Standard																																
BCWQG Aquatic Life Short-term Maximum (AW)[a]		28.7-100[d]	n/a	5	n/a	n/a	n/a	n/a	0.038-0.918[f]	n/a	n/a	110	3.2-16.5[f]	350 (max)	3-141[f]	n/a	n/a	815-2,237[f]	0.02[i]	2,000	n/a	n/a	n/a	0.1-3[f]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-81[f]
BCWQG Aquatic Life Long-Term Average (AW)[b]		9.6-50[d]	9	n/a	1,000	0.13	n/a	1,200	0.0176-0.291[f]	n/a	1 (Cr(+6))	4	2-6.2[f]	n/a	3-8.8[f]	n/a	n/a	767-1,283[f]	n/a	1,000	25-133[f]	n/a	2	0.05-1.5[f]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-55.5[f]
CSR Aquatic Life (AW)[c]		n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[f]	n/a	10[g]	40	20-90[f]	n/a	40-160[f]	n/a	n/a	n/a	0.25	10,000	250-1,500[f]	n/a	20	0.5-15[f]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[f]
CSR Irrigation Watering (IW)		5,000	n/a	100	n/a	100	n/a	500-6,000[e]	5	n/a	5[g]	50	200	5,000	200	2,500	n/a	200	1	10-30[j]	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	n/a
CSR Livestock Watering (LW)		5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[g]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)		9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[g]	20[h]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Study Area 8																																
EV_LSgw	2018 02 15	< 3.0	< 0.10	1.25	154	< 0.020	< 0.050	31	< 0.0050	103	< 0.10	0.92	< 0.50	1,450	< 0.050	52.4	70.2	*1,080*	< 0.0050	2.59	3.79	2.93	0.116	< 0.010	8.54	413	0.038	< 0.10	< 10	2.11	< 0.50	< 3.0
	2018 05 10	< 3.0	< 0.10	1.47	151	< 0.020	< 0.050	38	0.0062	107	< 0.10	0.88	< 0.50	1,870	< 0.050	64.9	72.2	*1,020*	< 0.0050	2.81	3.96	3.49	0.075	< 0.010	8.36	463	0.032	< 0.10	< 10	2.26	< 0.50	1.9
	2018 09 06	< 3.0	< 0.10	2.63	268	< 0.020	< 0.050	56	< 0.0050	116	< 0.10	1.31	< 0.50	3,430	< 0.050	62.0	80.1	*1,220*	< 0.0050	2.90	4.61	4.57	0.073	< 0.010	8.56	503	0.046	< 0.10	< 10	1.53	< 0.50	2.0
	2018 10 09	< 3.0	< 0.10	2.79	202	< 0.020	< 0.050	48	< 0.0050	107	< 0.10	1.20	< 0.50	3,090	< 0.050	58.2	74.5	*1,140*	< 0.0050	2.51	4.68	4.63	0.077	< 0.010	9.00	463	0.047	< 0.10	< 10	1.64	< 0.50	1.3
EV_OCgw**	2018 02 21	< 3.0	< 0.10	1.22	59.0	< 0.020	< 0.050	120	< 0.0050	26.9	< 0.10	< 0.10	0.72	245	< 0.050	22.8	19.0	74.1	< 0.00050	*12.4*	< 0.50	1.66	< 0.050	< 0.010	44.1	406	< 0.010	< 0.10	< 10	1.06	< 0.50	< 3.0
	Duplicate	3.0	< 0.10	1.32	58.7	< 0.020	< 0.050	122	< 0.0050	26.0	< 0.10	< 0.10	< 0.50	239	< 0.050	23.1	19.0	76.7	< 0.00050	*13.7*	< 0.50	1.62	0.087	< 0.010	44.1	412	< 0.010	< 0.10	< 10	1.12	< 0.50	< 3.0
	QA/QC RPD%	*	*	8	1	*	*	2	*	3	*	*	*	2	*	1	0	3	*	10	*	2	*	*	0	1	*	*	*	6	*	*
	2018 05 15	< 3.0	< 0.10	1.48	55.9	< 0.020	< 0.050	102	0.0073	26.8	< 0.10	0.20	2.18	185	< 0.050	23.1	19.2	68.6	< 0.00050	*15.5*	< 0.50	1.62	< 0.050	< 0.010	43.0	442	< 0.010	< 0.10	< 10	1.34	< 0.50	7.4
	Duplicate	< 3.0	< 0.10	1.41	58.6	< 0.020	< 0.050	102	< 0.0050	26.3	< 0.10	0.19	< 0.50	205	< 0.050	23.1	20.1	66.4	< 0.00050	*15.3*	< 0.50	1.65	< 0.050	< 0.010	44.6	451	< 0.010	< 0.10	< 10	1.36	< 0.50	< 1.0
	QA/QC RPD%	*	*	5	5	*	*	0	*	2	*	*	*	10	*	0	5	3	*	1	*	2	*	*	4	2	*	*	*	1	*	*
	2018 08 20	< 3.0	< 0.10	1.45	60.5	< 0.020	< 0.050	121	< 0.0050	29.0	< 0.10	0.13	< 0.50	340	< 0.050	26.4	19.9	90.0	< 0.00050	*14.9*	< 0.50	1.75	< 0.050	< 0.010	51.9	412	< 0.010	< 0.10	< 10	1.13	< 0.50	2.0
	Duplicate	3.1	< 0.10	1.53	60.1	< 0.020	< 0.050	122	< 0.0050	28.7	< 0.10	0.13	< 0.50	337	< 0.050	26.0	20.0	90.4	< 0.00050	*14.8*	< 0.50	1.73	< 0.050	< 0.010	51.9	405	< 0.010	< 0.10	< 10	1.10	< 0.50	< 1.0
	QA/QC RPD%	*	*	5	1	*	*	1	*	1	*	*	*	1	*	2	1	< 1	*	1	*	1	*	*	0	2	*	*	*	3	*	*
	2018 10 17	< 3.0	< 0.10	1.49	54.3	< 0.020	< 0.050	133	< 0.0050	28.2	< 0.10	< 0.10	< 0.50	330	< 0.050	26.7	19.1	85.5	< 0.00050	*14.5*	< 0.50	1.59	< 0.050	< 0.010	46.0	392	< 0.010	< 0.10	< 10	1.09	< 0.50	< 1.0
	Duplicate	< 3.0	< 0.10	1.47	54.1	< 0.020	< 0.050	131	< 0.0050	28.4	< 0.10	0.10	< 0.50	322	< 0.050	26.6	18.9	84.6	< 0.00050	*14.4*	< 0.50	1.58	< 0.050	< 0.010	45.6	387	< 0.010	< 0.10	< 10	1.09	< 0.50	< 1.0
	QA/QC RPD%	*	*	1	< 1	*	*	2	*	1	*	*	*	2	*	< 1	1	1	*	1	*	1	*	*	1	1	*	*	*	0	*	*
Study Area 9																																
EV_BCgw	2018 02 15	< 3.0	0.11	0.12	46.5	< 0.020	< 0.050	17	0.0521	142	0.14	< 0.10	< 0.50	11	< 0.050	36.6	55.0	< 0.10	< 0.0050	0.727	< 0.50	1.33	***46.9***	< 0.010	5.51	243	0.017	< 0.10	< 10	1.72	< 0.50	< 3.0
	Duplicate	< 3.0	0.11	0.12	44.6	< 0.020	< 0.050	17	0.0446	139	0.15	< 0.10	< 0.50	< 10	< 0.050	35.7	54.7	< 0.10	< 0.0050	0.708	< 0.50	1.32	***45.7***	< 0.010	5.40	240	0.015	< 0.10	< 10	1.69	< 0.50	< 3.0
	QA/QC RPD%	*	*	*	4	*	*	*	16	2	*	*	*	*	*	2	1	*	*	3	*	1	3	*	2	1	*	*	*	2	*	*
	2018 05 09	< 3.0	0.13	0.15	44.9	< 0.020	< 0.050	15	0.0504	131	0.18	< 0.10	0.91	< 10	< 0.050	31.7	53.0	< 0.10	< 0.0050	0.943	0.74	1.32	***39***	< 0.010	5.60	232	0.015	< 0.10	< 10	1.69	< 0.50	2.1
	2018 08 21	< 3.0	0.11	0.11	42.1	< 0.020	< 0.050	14	0.0480	113	0.13	< 0.10	< 0.50	< 10	< 0.050	28.7	50.6	< 0.10	< 0.0050	0.810	0.63	1.31	***36.7***	< 0.010	5.01	209	0.015	< 0.10	< 10	1.60	< 0.50	2.1
	2018 10 24	< 3.0	< 0.10	0.11	39.9	< 0.020	< 0.050	18	0.0448	116	0.16	< 0.10	0.56	< 10	< 0.050	29.9	49.1	0.25	< 0.0050	0.839	1.10	1.32	***29.8***	< 0.010	5.39	194	0.014	< 0.10	< 10	1.53	< 0.50	2.7
EV_MCgwS	2018 03 08	< 3.0	< 0.10	1.24	24.0	< 0.020	< 0.050	23	< 0.0050	91.7	< 0.10	< 0.10	< 0.50	1,900	< 0.050	23.8	33.3	114	< 0.00050	3.13	0.57	1.69	< 0.050	< 0.010	26.1	291	< 0.010	< 0.10	< 10	1.88	< 0.50	< 3.0
	2018 05 10	< 3.0	< 0.10	1.50	25.8	< 0.020	< 0.050	25	< 0.0050	100	< 0.10	0.12	0.71	2,090	< 0.050	25.4	34.0	124	< 0.00050	3.45	0.91	1.68	< 0.050	< 0.010	33.9	290	< 0.010	< 0.10	< 10	2.18	< 0.50	5.7
	2018 08 20	< 3.0	< 0.10	0.97	26.6	< 0.020	< 0.050	26	< 0.0050	97.8	< 0.10	< 0.10	< 0.50	1,600	< 0.050	25.6	34.8	133	< 0.00050	2.19	< 0.50	1.87	1.31	< 0.010	39.6	312	< 0.010	< 0.10	< 10	1.65	< 0.50	< 1.0
	2018 10 17	< 3.0	< 0.10	1.22	25.1	< 0.020	< 0.050	31	< 0.0050	92.1	0.35	0.12	< 0.50	1,560	< 0.050	25.2	33.4	133	< 0.00050	3.95	0.82	1.96	< 0.050	< 0.010	42.3	313	< 0.010	< 0.10	< 10	2.03	< 0.50	< 1.0
EV_MCgwD	2018 03 08	< 3.0	0.25	0.68	82.9	< 0.020	< 0.050	63	0.0503	52.6	< 0.10	0.84	3.64	< 10	< 0.050	8.7	26.0	*388*	< 0.00050	*11.8*	15.9	1.66	0.189	< 0.010	22.3	506	0.074	0.10	< 10	2.44	< 0.50	28.4
	2018 05 10	< 3.0	0.16	0.55	70.2	< 0.020	< 0.050	68	0.0434	53.7	< 0.10	0.41	1.83	< 10	< 0.050	10.3	26.3	*303*	< 0.00050	*16.5*	6.75	1.51	0.263	< 0.010	41.7	486	0.075	< 0.10	< 10	3.73	< 0.50	5.3
	2018 08 20	< 3.0	0.14	0.64	62.6	< 0.020	< 0.050	66	0.0552	50.9	< 0.10	0.50	2.63	< 10	< 0.050	11.5	25.0	*317*	< 0.00050	*18.0*	5.49	1.58	0.216	< 0.010	55.6	471	0.068	< 0.10	< 10	3.99	< 0.50	10.7
	2018 10 17	< 3.0	0.14	0.47	66.8	< 0.020	< 0.050	76	0.0627	52.3	0.14	0.19	2.08	< 10	< 0.050	9.7	26.5	164	< 0.00050	*15.5*	5.02	1.42	0.231	< 0.010	33.6	483	0.062	< 0.10	< 10	3.03	< 0.50	8.8
EV_BRgw	2018 02 14	< 3.0	< 0.20	< 0.20	74.9	< 0.040	< 0.10	37	0.055	183	< 0.20	< 0.20	0.64	23	< 0.10	57.4	55.0	2.18	< 0.0050	0.67	2.7	2.13	***23.7***	< 0.020	9.75	394	< 0.020	< 0.20	< 10	1.84	< 1.0	< 3.0
	2018 05 02	< 3.0	< 0.10	< 0.10	72.8	< 0.020	< 0.050	34	0.0540	172	0.10	< 0.10	< 0.50	14	< 0.050	49.2	58.9	1.48	< 0.0050	0.622	2.60	2.28	***21.4***	< 0.010	9.86	361	< 0.010	< 0.10	< 10	1.58	< 0.50	3.4
	2018 08 21	< 3.0	< 0.10	< 0.10	67.9	< 0.020	< 0.050	30	0.0539	178	< 0.10	< 0.10	0.52	16	< 0.050	51.4	60.5	4.59	< 0.0050	0.598	2.13	2.18	***45.5***	< 0.010	9.53	348	< 0.010	< 0.10	< 10	1.70	< 0.50	2.8
	2018 10 16	< 3.0	0.11	0.11	76.3	< 0.020	< 0.050	39	0.0525	175	0.13	< 0.10	< 0.50	< 10	< 0.050	60.2	58.4	1.30	< 0.0050	0.611	1.92	2.35	***35.6***	< 0.010	10.1	359	0.013	< 0.10	< 10	1.90	< 0.50	1.7
EV_RCgw	2018 02 14	25.3	0.25	< 0.20	46.6	< 0.040	< 0.10	21	0.230	355	< 0.20	< 0.20	**139**	< 20	0.67	68.3	166	0.69	< 0.0050	1.67	3.3	3.27	***193***	< 0.020	5.32	429	< 0.020	< 0.20	< 10	7.59	< 1.0	63.6
	2018 05 02	< 3.0	0.43	< 0.20	41.1	< 0.040	< 0.10	< 20	0.501	355	< 0.20	< 0.20	***575***	24	1.14	67.4	183	8.24	< 0.0050	1.43	16.3	3.39	***229***	< 0.020	7.06	421	< 0.020	< 0.20	< 10	6.98	< 1.0	943
	2018 08 21	< 3.0	0.20	0.14	38.5	< 0.020	< 0.050	16	0.360	337	0.15	0.15	88.7	< 10	0.614	57.8	177	1.87	< 0.0050	1.40	5.77	3.63	***244***	< 0.010	4.65	382	0.016	0.19	< 10	6.87	< 0.50	375
	2018 10 16	< 3.0	0.22	0.16	45.6	< 0.020	< 0.050	20	0.265	349	0.18	0.12	29.7	< 10	0.251	70.9	166	1.17	< 0.0050	1.31	2.29	3.79	***216***	< 0.010	6.06	411	0.017	< 0.10	< 10	7.66	< 0.50	36.7

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.
RDL Denotes reported detection limit.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[c] Standard to protect freshwater aquatic life.
[d] Guideline/standard varies with pH.
[e] Standard varies with crop.
[f] Guideline/standard varies with hardness.
[g] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[h] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[i] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg
[j] Standard ranges between 10 to 30 ug/L and varies with crop, soil drainage and Mo:Cu ratio. Conservative standard of 10 ug/L was applied.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

TABLE 5 (Cont'd): Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Metals in Groundwater

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																													
		Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[k] µg/L
BC Guideline/Standard																															
BCWQG Aquatic Life Short-term Maximum (AW)[a]		28.7-100[d]	n/a	5	n/a	n/a	n/a	n/a	0.038-0.918[f]	n/a	n/a	110	3.2-16.5[f]	350 (max)	3-141[f]	n/a	n/a	815-2,237[f]	0.02[i]	2,000	n/a	n/a	n/a	0.1-3[f]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-81[f]
BCWQG Aquatic Life Long-Term Average (AW)[b]		9.6-50[d]	9	n/a	1,000	0.13	n/a	1,200	0.0176-0.291[f]	n/a	1 (Cr(+6))	4	2-6.2[f]	n/a	3-8.8[f]	n/a	n/a	767-1,283[f]	n/a	1,000	25-133[f]	n/a	2	0.05-1.5[f]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-55.5[f]
CSR Aquatic Life (AW)[c]		n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[f]	n/a	10[g]	40	20-90[f]	n/a	40-160[f]	n/a	n/a	n/a	0.25	10,000	250-1,500[f]	n/a	20	0.5-15[f]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[f]
CSR Irrigation Watering (IW)		5,000	n/a	100	n/a	100	n/a	500-6,000[e]	5	n/a	5[g]	50	200	5,000	200	2,500	n/a	200	1	10-30[j]	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	n/a
CSR Livestock Watering (LW)		5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[g]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)		9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[g]	20[h]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Study Area 9 (Cont'd)																															
EV_WH50gw	2018 02 14	< 3.0	0.13	0.11	108	< 0.020	< 0.050	< 10	0.0193	70.7	0.15	< 0.10	< 0.50	19	< 0.050	9.0	25.6	2.79	< 0.0050	0.988	< 0.50	0.814	13.4	< 0.010	3.55	160	< 0.010	< 0.10	< 10	1.31	< 0.50	< 3.0
	2018 05 02	< 3.0	0.16	0.10	101	< 0.020	< 0.050	10	0.0218	64.0	0.13	< 0.10	5.02	28	< 0.050	9.0	24.1	4.39	< 0.0050	1.16	< 0.50	0.808	11	< 0.010	3.71	149	< 0.010	< 0.10	< 10	1.12	< 0.50	8.1
	2018 08 21	< 3.0	0.19	< 0.10	121	< 0.020	< 0.050	13	0.0210	77.3	< 0.10	< 0.10	< 0.50	19	< 0.050	14.5	30.6	8.08	< 0.0050	1.25	< 0.50	1.21	16.8	< 0.010	3.93	183	< 0.010	< 0.10	< 10	1.35	< 0.50	< 1.0
	2018 10 16	< 3.0	0.23	< 0.10	151	< 0.020	< 0.050	14	0.0202	80.1	0.14	< 0.10	0.62	11	< 0.050	16.6	30.6	4.25	< 0.0050	1.37	< 0.50	1.36	16.8	< 0.010	3.98	195	< 0.010	< 0.10	< 10	1.59	< 0.50	< 1.0
RG_DW-03-01	2018 02 26	< 3.0	< 0.10	< 0.10	138	< 0.020	< 0.050	36	0.0795	122	< 0.10	0.12	< 0.50	87	< 0.050	21.6	35.4	170	< 0.0050	2.66	2.52	2.05	0.19	< 0.010	15.1	413	0.104	< 0.10	< 10	0.801	< 0.50	< 3.0
	2018 04 23	< 3.0	< 0.10	< 0.10	135	< 0.020	< 0.050	32	0.0795	108	< 0.10	0.10	< 0.50	67	< 0.050	19.4	35.8	152	< 0.0050	3.08	2.51	2.06	0.193	< 0.010	15.3	410	0.110	< 0.10	< 10	1.00	< 0.50	2.6
	2018 09 27	< 3.0	< 0.10	< 0.10	145	< 0.020	< 0.050	34	0.0727	119	< 0.10	< 0.10	< 0.50	47	< 0.050	19.8	36.7	145	< 0.0050	3.16	2.52	2.08	0.204	< 0.010	15.1	447	0.107	< 0.10	< 10	0.969	< 0.50	1.4
	2018 11 27	< 3.0	< 0.10	< 0.10	126	< 0.020	< 0.050	34	0.0740	118	< 0.10	< 0.10	< 0.50	49	< 0.050	20.4	35.7	137	< 0.0050	3.01	2.55	2.12	0.196	< 0.010	15.3	442	0.100	< 0.10	< 10	0.976	< 0.50	1.1
Study Area 10																															
EV_ECgw	2018 02 20	3.2	< 0.10	0.40	52.8	< 0.020	< 0.050	102	0.0147	38.4	0.14	0.30	0.87	< 10	< 0.050	10.9	19.7	195	< 0.0050	*13.7*	1.77	0.937	0.15	< 0.010	28.4	443	0.015	0.20	< 10	1.23	< 0.50	< 3.0
	2018 05 10	< 3.0	< 0.10	0.32	49.4	< 0.020	< 0.050	103	0.0365	36.0	< 0.10	0.24	4.72	< 10	< 0.050	11.7	16.4	146	< 0.0050	*14.1*	1.30	0.935	0.089	< 0.010	23.9	425	0.021	0.37	< 10	1.25	< 0.50	9.0
	2018 09 19	< 3.0	< 0.10	0.45	61.1	< 0.020	< 0.050	117	0.0481	38.6	< 0.10	0.32	5.85	< 10	< 0.050	11.3	19.7	178	< 0.0050	*15.3*	6.63	3.74	0.206	< 0.010	25.4	471	0.026	0.31	< 10	1.08	< 0.50	6.1
	2018 10 24	< 3.0	< 0.10	0.41	59.4	< 0.020	< 0.050	124	0.0326	38.5	< 0.10	0.31	1.22	< 10	< 0.050	11.8	19.9	187	< 0.0050	*14.2*	2.02	1.15	0.069	< 0.010	29.4	409	0.028	< 0.10	< 10	1.22	< 0.50	2.8
Study Area 11																															
CM_MW1-OB	2018 03 22	< 3.0	< 0.10	< 0.10	61.6	< 0.020	< 0.050	28	0.0695	148	0.49	< 0.10	0.91	< 10	0.114	16.7	43.1	0.45	< 0.050	0.762	3.22	1.42	2.89	< 0.010	29.6	324	0.022	< 0.10	< 10	0.936	< 0.50	26.6
	2018 06 27	< 3.0	< 0.10	0.12	104	< 0.020	< 0.050	38	0.0569	149	0.30	< 0.10	0.70	< 10	0.123	17.4	45.2	0.25	< 0.0050	0.292	0.75	1.82	2.69	< 0.010	29.5	391	0.018	< 0.10	< 10	1.35	< 0.50	29.4
	2018 09 19	< 3.0	< 0.10	0.15	138	< 0.020	< 0.050	46	0.0686	168	0.28	< 0.10	< 0.50	< 10	< 0.050	29.3	50.7	0.24	< 0.0050	0.284	0.51	2.36	2.04	< 0.010	51.9	487	0.022	< 0.10	< 10	1.17	< 0.50	7.6
	Duplicate	< 3.0	< 0.10	0.14	135	< 0.020	< 0.050	46	0.0761	170	0.55	< 0.10	< 0.50	< 10	< 0.050	28.9	52.8	0.26	< 0.0050	0.386	0.54	2.47	2.2	< 0.010	54.0	501	0.021	< 0.10	< 10	1.19	< 0.50	8.0
	QA/QC RPD%	*	*	*	2	*	*	*	10	1	*	*	*	*	*	1	4	*	*	30	*	5	8	*	4	3	*	*	*	2	*	5
	2018 11 21	< 3.0	< 0.10	0.13	119	< 0.020	< 0.050	35	0.0668	155	0.36	< 0.10	< 0.50	< 10	< 0.050	20.6	49.1	0.14	< 0.0050	0.278	0.53	2.25	2.71	< 0.010	80.8	450	0.018	< 0.10	< 10	1.44	< 0.50	8.9
CM_MW1-SH	2018 03 22	4.5	< 0.10	1.73	294	< 0.020	< 0.050	61	< 0.025	31.1	0.11	0.25	< 0.50	343	< 0.050	19.5	11.3	156	< 0.0050	*63.4*	0.76	1.24	< 0.050	< 0.010	183	303	< 0.010	0.11	< 10	1.05	< 0.50	8.2
	Duplicate	3.4	< 0.10	1.72	299	< 0.020	< 0.050	59	< 0.015	30.7	< 0.10	0.22	< 0.50	381	< 0.050	20.3	11.4	155	< 0.0050	*61.0*	0.66	1.23	< 0.050	< 0.010	182	299	< 0.010	< 0.10	< 10	1.05	< 0.50	< 3.0
	QA/QC RPD%	*	*	1	2	*	*	3	*	1	*	*	*	10	*	4	1	1	*	4	*	1	*	*	1	1	*	*	*	0	*	*
	2018 06 27	4.3	< 0.10	1.65	297	< 0.020	< 0.050	55	< 0.015	29.6	< 0.10	0.24	< 0.50	451	< 0.050	17.6	11.8	183	< 0.0050	*60.1*	< 0.50	1.29	< 0.050	< 0.010	170	313	< 0.010	0.12	< 10	1.00	< 0.50	10.7
	2018 09 19	< 3.0	< 0.10	1.64	292	< 0.020	< 0.050	54	< 0.020	27.0	< 0.10	0.19	< 0.50	380	< 0.050	20.2	9.61	138	< 0.0050	*60.0*	< 0.50	1.08	< 0.050	< 0.010	163	285	< 0.010	< 0.10	< 10	0.804	< 0.50	2.5
	2018 11 21	3.2	< 0.10	1.69	282	< 0.020	< 0.050	60	< 0.020	25.2	< 0.10	0.19	< 0.50	393	< 0.050	20.7	10.0	130	< 0.0050	*59.6*	< 0.50	1.11	< 0.050	< 0.010	170	273	< 0.010	< 0.10	< 10	0.923	< 0.50	< 1.0
	Duplicate	3.8	< 0.10	1.69	281	< 0.020	< 0.050	60	< 0.020	26.2	< 0.10	0.19	< 0.50	425	< 0.050	19.9	9.98	132	< 0.0050	*55.8*	< 0.50	1.09	< 0.050	< 0.010	166	261	< 0.010	0.10	< 10	0.885	< 0.50	< 1.0
	QA/QC RPD%	*	*	0	< 1	*	*	0	*	4	*	*	*	8	*	4	< 1	2	*	7	*	2	*	*	2	4	*	*	*	4	*	*
CM_MW1-DP	2018 03 22	4.1	< 0.20	2.07	8,790	< 0.040	< 0.10	235	< 0.010	32.1	< 0.20	0.61	< 0.50	734	< 0.10	591	16.0	148	< 0.050	4.35	< 1.0	4.77	< 0.10	< 0.020	213	2,270	< 0.020	< 0.20	< 10	0.746	< 1.0	4.7
	2018 06 27	3.1	< 0.10	2.12	**10,600**	< 0.020	< 0.050	219	< 0.0050	29.6	< 0.10	0.63	< 0.50	767	< 0.050	593	18.4	158	< 0.0050	4.15	< 0.50	5.69	< 0.050	< 0.010	242	2,330	< 0.010	0.24	< 10	0.715	< 0.50	6.3
	Duplicate	3.0	< 0.10	2.21	**11,200**	< 0.020	< 0.050	230	< 0.0050	29.8	< 0.10	0.65	< 0.50	723	< 0.050	687	19.2	168	< 0.0050	4.11	< 0.50	5.89	< 0.10	< 0.010	247	2,350	< 0.010	0.13	< 10	0.733	< 0.50	6.0
	QA/QC RPD%	*	*	4	6	*	*	5	*	1	*	3	*	6	*	15	4	6	*	1	*	3	*	*	2	1	*	*	*	2	*	5
	2018 09 19	3.8	< 0.10	1.88	**10,200**	< 0.020	< 0.050	212	< 0.0050	31.2	< 0.10	0.54	< 0.50	621	< 0.050	686	16.8	131	< 0.0050	4.16	< 0.50	4.92	0.081	< 0.010	216	2,340	< 0.010	0.19	< 10	0.649	< 0.50	4.3
	2018 11 21	3.1	< 0.10	1.29	9,720	< 0.020	< 0.050	257	< 0.0050	28.8	< 0.10	0.67	< 0.50	29	< 0.050	724	16.8	116	< 0.0050	3.64	0.71	5.27	0.053	< 0.010	232	2,280	< 0.010	0.41	< 10	0.620	< 0.50	5.6
Study Area 12																															
EV_ER1gwS	2018 02 21	< 3.0	< 0.10	0.12	133	< 0.020	< 0.050	11	0.0163	71.4	0.34	< 0.10	4.90	< 10	< 0.050	7.3	23.9	0.77	< 0.0050	0.966	< 0.50	0.803	10.8	< 0.010	8.31	235	< 0.010	< 0.10	< 10	1.10	< 0.50	7.8
	2018 05 16	< 3.0	< 0.10	0.11	128	< 0.020	< 0.050	13	0.0184	74.5	0.25	< 0.10	< 0.50	< 10	< 0.050	7.6	19.9	< 0.10	< 0.0050	0.800	< 0.50	0.945	8.02	< 0.010	10.8	209	< 0.010	< 0.10	< 10	0.999	< 0.50	< 1.0
	2018 09 18	< 3.0	< 0.10	0.15	108	< 0.020	< 0.050	< 10	0.0132	65.8	0.24	< 0.10	< 0.50	< 10	< 0.050	7.8	19.4	0.26	< 0.0050	1.33	< 0.50	0.848	11.8	< 0.010	3.07	195	< 0.010	< 0.10	< 10	1.16	< 0.50	< 2.0
	2018 10 09	< 3.0	< 0.10	0.13	101	< 0.020	< 0.050	< 10	0.0103	60.8	0.28	< 0.10	< 0.50	< 10	< 0.050	7.6	19.6	< 0.10	< 0.0050	1.32	< 0.50	0.829	10.5	< 0.010	3.23	187	< 0.010	< 0.10	< 10	1.18	< 0.50	< 1.0
EV_ER1gwD	2018 02 21	9.2	< 0.10	0.12	90.2	< 0.020	< 0.050	< 10	< 0.0050	60.9	0.35	< 0.10	< 0.50	< 10	< 0.050	6.2	23.0	0.47	< 0.0050	1.15	< 0.50	0.640	10.1	< 0.010	3.34	215	< 0.010	< 0.10	< 10	1.43	< 0.50	< 3.0
	2018 05 16	8.0	< 0.10	0.11	78.6	< 0.020	< 0.050	12	< 0.0050	59.5	0.72	< 0.10	< 0.50	< 10	< 0.050	7.2	19.2	2.53	< 0.0050	1.45	0.56	0.610	7.52	< 0.010	3.25	193	< 0.010	< 0.10	< 10	1.48	< 0.50	< 1.0
	2018 09 18	7.5	< 0.10	0.19	99.5	< 0.020	< 0.050	< 10	< 0.0050	59.8	0.34	0.29	< 0.60	< 10	< 0.050	7.3	20.4	77.1	< 0.0050	1.61	1.61	0.803	4.56	< 0.010	2.95	193	< 0.010	< 0.10	< 10	1.45	< 0.50	< 3.0
	2018 10 09	11.5	< 0.10	0.10	84.8	< 0.020	< 0.050	< 10	0.0051	58.8	0.46	< 0.10	< 0.50	12	< 0.050	7.7	20.0	2.65	< 0.0050	1.48	0.55	0.773	5.99	< 0.010	2.74	197	< 0.010	< 0.10	< 10	1.42	< 0.50	< 1.0

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.
RDL Denotes reported detection limit.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[c] Standard to protect freshwater aquatic life.
[d] Guideline/standard varies with pH.
[e] Standard varies with crop.
[f] Guideline/standard varies with hardness.
[g] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[h] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[i] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg
[j] Standard ranges between 10 to 30 ug/L and varies with crop, soil drainage and Mo:Cu ratio. Conservative standard of 10 ug/L was applied.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

TABLE 5 (Cont'd): Summary of Analytical Results compared to Primary Screening Criteria for Dissolved Metals in Groundwater

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																														
		Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[k] µg/L
BC Guideline/Standard																																
BCWQG Aquatic Life Short-term Maximum (AW)[a]		28.7-100[d]	n/a	5	n/a	n/a	n/a	n/a	0.038-0.918[f]	n/a	n/a	110	3.2-16.5[f]	350 (max)	3-141[f]	n/a	n/a	815-2,237[f]	0.02[i]	2,000	n/a	n/a	n/a	0.1-3[f]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-81[f]
BCWQG Aquatic Life Long-Term Average (AW)[b]		9.6-50[d]	9	n/a	1,000	0.13	n/a	1,200	0.0176-0.291[f]	n/a	1 (Cr(+6))	4	2-6.2[f]	n/a	3-8.8[f]	n/a	n/a	767-1,283[f]	n/a	1,000	25-133[f]	n/a	2	0.05-1.5[f]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-55.5[f]
CSR Aquatic Life (AW)[c]		n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[f]	n/a	10[g]	40	20-90[f]	n/a	40-160[f]	n/a	n/a	n/a	0.25	10,000	250-1,500[f]	n/a	20	0.5-15[f]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[f]
CSR Irrigation Watering (IW)		5,000	n/a	100	n/a	100	n/a	500-6,000[e]	5	n/a	5[g]	50	200	5,000	200	2,500	n/a	200	1	10-30[j]	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	n/a
CSR Livestock Watering (LW)		5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[g]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)		9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[g]	20[h]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Study Area 12 (Cont'd)																																
RG_DW-03-04	2018 02 26	< 3.0	0.11	< 0.10	180	< 0.020	< 0.050	10	0.0152	82.2	< 0.30	< 0.10	< 0.50	< 10	< 0.050	9.2	24.4	0.29	< 0.0050	0.932	0.77	0.978	13.5	< 0.010	6.55	179	< 0.010	< 0.10	< 10	0.941	< 0.50	4.7
	2018 04 30	< 3.0	< 0.10	< 0.10	183	< 0.020	< 0.050	< 10	0.0204	86.7	0.12	< 0.10	< 0.50	< 10	< 0.050	9.6	28.8	0.28	< 0.0050	0.966	< 0.50	1.06	13.9	< 0.010	7.67	195	< 0.010	< 0.10	< 10	1.05	< 0.50	4.7
	2018 09 27	< 3.0	0.11	0.10	204	< 0.020	< 0.050	12	0.0131	81.9	0.18	< 0.10	0.74	< 10	< 0.050	9.3	27.6	< 0.10	< 0.0050	1.08	0.66	0.967	14.3	< 0.010	7.33	186	< 0.010	< 0.10	< 10	1.01	< 0.50	5.6
	2018 11 27	< 3.0	0.10	0.11	201	< 0.020	< 0.050	13	0.0187	81.4	0.20	< 0.10	0.72	< 10	0.120	10.6	27.4	0.16	< 0.0050	1.06	0.84	1.07	12	< 0.010	6.90	192	< 0.010	< 0.10	< 10	1.02	< 0.50	4.0
Field Blank																																
FR_HMW5	2018 06 06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW3-SH	2018 09 20	18.6	0.19	< 0.10	0.83	< 0.020	< 0.050	< 10	0.0084	0.193	< 0.10	< 0.10	< 0.50	21	4.69	< 1.0	< 0.10	1.61	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	0.110	0.66	< 0.010	0.38	< 10	< 0.010	< 0.50	4.2
CM_MW3-DP	2018 06 25	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
CM_MW3-DP	2018 11 15	< 3.0	< 0.10	0.11	82.2	< 0.020	< 0.050	21	0.0087	46.8	0.27	< 0.10	1.84	< 10	0.285	7.9	11.6	11.2	< 0.0050	0.983	< 0.50	0.694	0.186	< 0.010	3.96	289	< 0.010	< 0.10	< 10	0.210	< 0.50	28.2
FR_09-01-B	2018 12 13	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
GH_MW-PC	2018 08 20	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
GH_POTW10	2018 08 29	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
GH_POTW17	2018 03 06	< 3.0	< 0.10	< 0.10	< 0.050	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	0.15	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
GH_POTW17	2018 06 04	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
GH_POTW17	2018 10 16	-	-	-	-	-	-	-	-	< 0.05	-	-	-	-	-	-	< 0.005	-	< 0.005	-	-	< 0.05	-	-	< 0.05	-	-	-	-	-	-	-	-
GH_MW-ERSC-1	2018 05 16	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
GH_MW-ERSC-1	2018 03 06	< 3.0	< 0.10	< 0.10	< 0.050	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
GH_MW-ERSC-1	2018 10 17	-	-	-	-	-	-	-	-	< 0.05	-	-	-	-	-	-	< 0.005	-	< 0.005	-	-	< 0.05	-	-	< 0.05	-	-	-	-	-	-	-	-
LC_PIZP1101	2018 06 19	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
RG_DW-02-20	2018 02 13	< 3	< 0.1	< 0.1	< 0.05	< 0.02	< 0.05	< 10	< 0.005	< 0.05	< 0.1	< 0.1	< 0.5	< 10	< 0.05	< 1	< 0.1	< 0.1	< 0.005	< 0.05	< 0.5	< 0.05	< 0.05	< 0.01	< 0.05	< 0.2	< 0.01	< 0.1	< 10	< 0.01	< 0.5	< 3
EV_OCgw	2018 02 21	< 3.0	< 0.10	< 0.10	< 0.050	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	15	< 0.050	< 1.0	< 0.10	< 0.10	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
EV_OCgw	2018 05 15	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	1.1
EV_OCgw	2018 08 20	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
EV_OCgw	2018 10 17	< 3.0	< 0.10	< 0.10	0.14	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
EV_BCgw	2018 02 15	< 3.0	< 0.10	< 0.10	0.077	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
RG_DW-03-01	2018 09 27	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
CM_MW1-OB	2018 09 19	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	0.23	< 0.10	< 0.50	< 10	0.472	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
CM_MW1-SH	2018 03 22	< 3.0	< 0.10	< 0.10	0.050	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
CM_MW1-SH	2018 11 21	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
CM_MW1-DP	2018 06 27	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	0.12	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
Trip Blank																																
LC_PIZP1101	2018 03 20	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
LC_PIZP1101	2018 06 19	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
RG_DW-02-20	2018 02 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_BCgw	2018 02 15	< 3.0	< 0.10	< 0.10	< 0.050	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	12	< 0.050	< 1.0	< 0.10	0.11	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
EV_OCgw	2018 02 21	< 3.0	< 0.10	< 0.10	< 0.050	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
EV_OCgw	2018 05 15	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	0.00091	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-	-
EV_OCgw	2018 08 20	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	< 0.00050	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-	-
EV_OCgw	2018 10 17	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	< 0.00050	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-	-

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Comparison to BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline.
RDL Denotes reported detection limit.

BOLD**	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water and Total Metals, shown here for comparison purposes only.
[c] Standard to protect freshwater aquatic life.
[d] Guideline/standard varies with pH.
[e] Standard varies with crop.
[f] Guideline/standard varies with hardness.
[g] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[h] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[i] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg
[j] Standard ranges between 10 to 30 ug/L and varies with crop, soil drainage and Mo:Cu ratio. Conservative standard of 10 ug/L was applied.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

TABLE 6: Summary of Analytical Results compared to Secondary Screening Criteria for Selenium

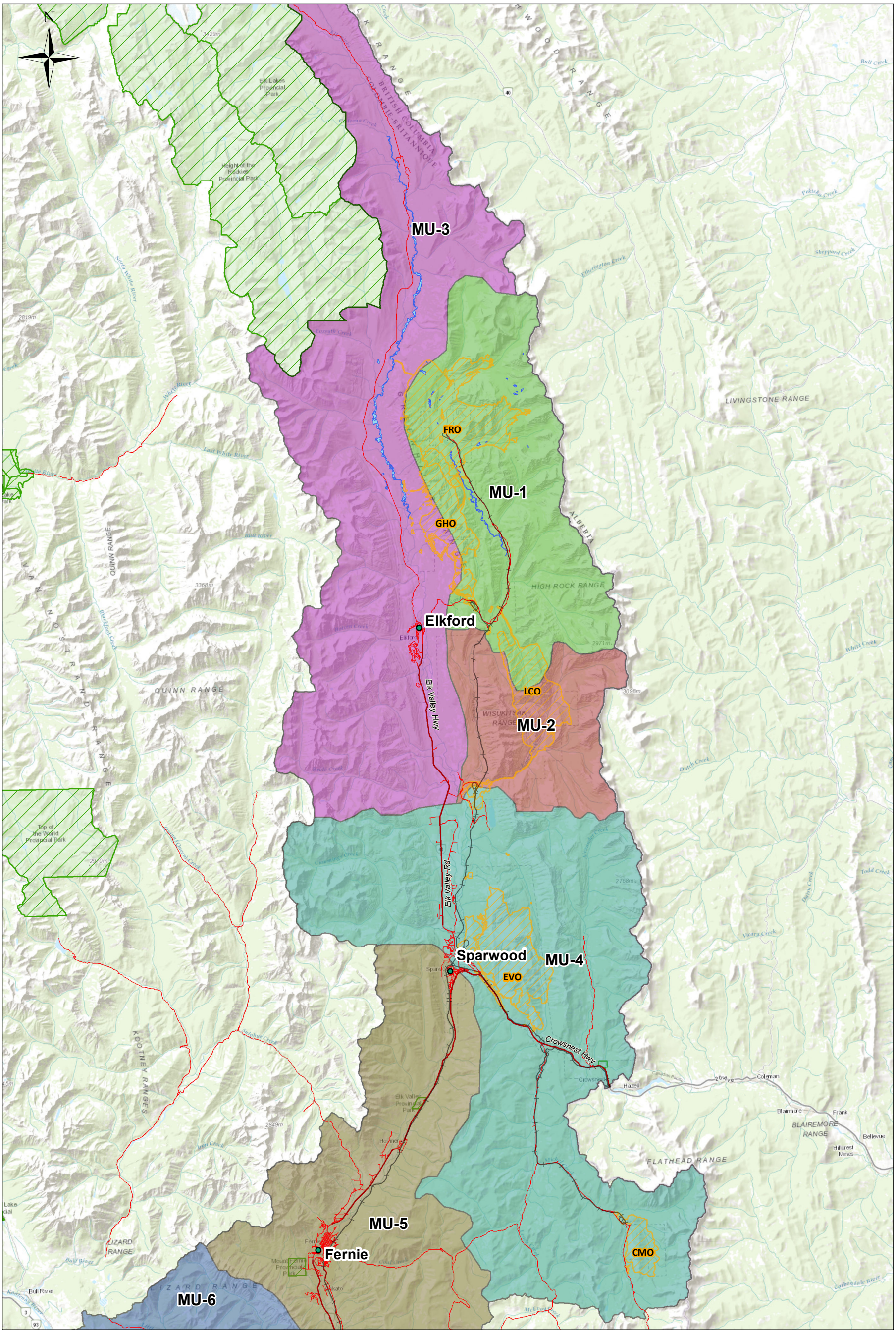
Sample Location	Sample Date (yyyy mm dd)	SPO	Compliance Point	Selenium µg/L
Groundwater Quality Benchmarks				
Guidelines for Canadian Drinking Water Quality (DW)				50
SPO	Elk River [GH_ER1 (E206661)/EV_ER1 (0200393)]/[CM_MC2 (E258937)]			19
	Fording River [GH_FR1 (0200378)]			63
Compliance Point	Fording River [FR_FRCP1 (E300071)]			130
	Fording River [GH_FR1 (0200378)]			80
	Elk River [GH_ERC (E300090)]			15
	Michel Creek [EV_MC2 (E300091)]			28
Study Area 1				
FR_09-01-A	2018 06 13	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**106**
	2018 07 31	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**81.2**
	2018 12 13	GH_FR1 (0200378)	FR_FRCP1 (E300071)	38.1
FR_09-01-B	2018 02 22	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**53.5**
	2018 06 13	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**97.1**
	2018 07 31	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**79.4**
	2018 12 13	GH_FR1 (0200378)	FR_FRCP1 (E300071)	41.8
FR_GH_WELL4	2018 01 31	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**109**
	2018 06 14	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**77**
	2018 07 31	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**76.9**
	2018 12 13	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**99.2**
GH_MW-PC	2018 03 28	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**61.3**
	2018 06 19	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**84**
	2018 08 20	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**65.7**
	2018 12 12	GH_FR1 (0200378)	FR_FRCP1 (E300071)	**70.3**
Study Area 3				
GH_POTW09	2018 09 17	GH_FR1 (0200378)	GH_FR1 (0200378)	**185**
GH_POTW17	2018 06 04	GH_FR1 (0200378)	GH_FR1 (0200378)	13.2
Study Area 4				
GH_MW-ERSC-1	2018 03 06	GH_ER1 (E206661)	GH_ERC (E3000090)	**68.1**
GH_GA-MW-2	2018 03 21	GH_ER1 (E206661)	GH_ERC (E3000090)	43.1
	2018 09 12	GH_ER1 (E206661)	GH_ERC (E3000090)	13.5
	2018 11 26	GH_ER1 (E206661)	GH_ERC (E3000090)	11.3
GH_GA-MW-3	2018 05 16	GH_ER1 (E206661)	GH_ERC (E3000090)	49.2
	2018 11 26	GH_ER1 (E206661)	GH_ERC (E3000090)	10.3
Study Area 7				
RG_DW-02-20	2018 02 13	EV_ER1 (0200393)	n/a	12.3
	2018 04 25	EV_ER1 (0200393)	n/a	12.8
Study Area 9				
EV_BCgw	2018 02 15	EV_ER1 (0200393)	EV_MC2 (E3000091)	46.9
	2018 05 09	EV_ER1 (0200393)	EV_MC2 (E3000091)	39
	2018 08 21	EV_ER1 (0200393)	EV_MC2 (E3000091)	36.7
	2018 10 24	EV_ER1 (0200393)	EV_MC2 (E3000091)	29.8
EV_BRgw	2018 02 14	EV_ER1 (0200393)	EV_MC2 (E3000091)	23.7
	2018 05 02	EV_ER1 (0200393)	EV_MC2 (E3000091)	21.4
	2018 08 21	EV_ER1 (0200393)	EV_MC2 (E3000091)	45.5
	2018 10 16	EV_ER1 (0200393)	EV_MC2 (E3000091)	35.6
EV_RCgw	2018 02 14	EV_ER1 (0200393)	EV_MC2 (E3000091)	**193**
	2018 05 02	EV_ER1 (0200393)	EV_MC2 (E3000091)	**229**
	2018 08 21	EV_ER1 (0200393)	EV_MC2 (E3000091)	**244**
	2018 10 16	EV_ER1 (0200393)	EV_MC2 (E3000091)	**216**
EV_WH50gw	2018 02 14	EV_ER1 (0200393)	EV_MC2 (E3000091)	13.4
	2018 05 02	EV_ER1 (0200393)	EV_MC2 (E3000091)	11
	2018 08 21	EV_ER1 (0200393)	EV_MC2 (E3000091)	16.8
	2018 10 16	EV_ER1 (0200393)	EV_MC2 (E3000091)	16.8
Study Area 12				
EV_ER1gwS	2018 02 21	EV_ER1 (0200393)	n/a	10.8
	2018 09 18	EV_ER1 (0200393)	n/a	11.8
	2018 10 09	EV_ER1 (0200393)	n/a	10.5
EV_ER1gwD	2018 02 21	EV_ER1 (0200393)	n/a	10.1
RG_DW-03-04	2018 02 26	EV_ER1 (0200393)	n/a	13.5
	2018 04 30	EV_ER1 (0200393)	n/a	13.9
	2018 09 27	EV_ER1 (0200393)	n/a	14.3
	2018 11 27	EV_ER1 (0200393)	n/a	12

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
n/a Denotes no applicable standard/guideline.

BOLD	Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
UNDERLINE	Concentration greater than SPO by Area.
SHADED	Concentration greater than Compliance Point by Area.

Drawings

- 661460-301: Site Location and Management Units
- 661460-302: Surficial Geology – North Half of Study Area
- 661460-303: Surficial Geology – South Half of Study Area
- 661460-304: Bedrock Geology – North Half of Study Area
- 661460-305: Bedrock Geology – South Half of Study Area
- 661460-306: Groundwater Elevations from Q4 and Conceptual Regional Groundwater Flow – North Half of Study Area
- 661460-307: Groundwater Elevations from Q4 and Conceptual Regional Groundwater Flow – South Half of Study Area
- 661460-308: Study Areas 1 to 4 and Sample Location Plan
- 661460-309: Study Areas 5 to 7 and Sample Location Plan
- 661460-310: Study Areas 8 to 10 and 12 and Sample Location Plan
- 661460-311: Study Area 11 and Sample Location Plan
- 661460-312: Study Area 1 – Inferred Geological Cross-Section A-A'
- 661460-313: Study Area 1 – Inferred Geological Cross-Section B-B'
- 661460-314: Study Area 1 – Inferred Geological Cross-Section C-C'
- 661460-315: Study Area 3 – Inferred Geological Cross-Section D-D'
- 661460-316: Study Area 3 – Inferred Geological Cross-Section E-E'
- 661460-317: Study Area 4 – Inferred Geological Cross-Section F-F'
- 661460-318: Study Area 5/6 – Inferred Geological Cross-Section G-G'
- 661460-319: Study Area 5/6 – Inferred Geological Cross-Section H-H'
- 661460-320: Study Area 7 – Inferred Geological Cross-Section I-I'
- 661460-321: Study Area 8 – Inferred Geological Cross-Section J-J'
- 661460-322: Study Area 8 – Inferred Geological Cross-Section K-K'
- 661460-323: Study Area 9 – Inferred Geological Cross-Section L-L'
- 661460-324: Study Area 9 – Inferred Geological Cross-Section M-M'
- 661460-325: Study Area 12 – Inferred Geological Cross-Section N-N'
- 661460-326: Study Area 12 – Inferred Geological Cross-Section O-O'
- 661460-327: Spatial Distribution of Dissolved Selenium in Groundwater – Study Areas 1 to 4
- 661460-328: Spatial Distribution of Nitrate Nitrogen in Groundwater – Study Areas 1 to 4
- 661460-329: Spatial Distribution of Sulphate in Groundwater – Study Areas 1 to 4
- 661460-330: Spatial Distribution of Dissolved Cadmium in Groundwater – Study Areas 1 to 4
- 661460-331: Spatial Distribution of Dissolved Selenium in Groundwater – Study Areas 5 to 7
- 661460-332: Spatial Distribution of Nitrate Nitrogen in Groundwater – Study Areas 5 to 7
- 661460-333: Spatial Distribution of Sulphate in Groundwater – Study Areas 5 to 7
- 661460-334: Spatial Distribution of Dissolved Cadmium in Groundwater – Study Areas 5 to 7
- 661460-335: Spatial Distribution of Dissolved Selenium in Groundwater – Study Areas 8 to 10 and 12
- 661460-336: Spatial Distribution of Nitrate Nitrogen in Groundwater – Study Areas 8 to 10 and 12
- 661460-337: Spatial Distribution of Sulphate in Groundwater – Study Areas 8 to 10 and 12
- 661460-338: Spatial Distribution of Dissolved Cadmium in Groundwater – Study Areas 8 to 10 and 12
- 661460-339: Spatial Distribution of Dissolved Selenium in Groundwater – Study Area 11
- 661460-340: Spatial Distribution of Nitrate Nitrogen in Groundwater – Study Area 11
- 661460-341: Spatial Distribution of Sulphate in Groundwater – Study Area 11
- 661460-342: Spatial Distribution of Dissolved Cadmium in Groundwater – Study Area 11



Legend

- Rails
- Highway
- Secondary Road
- Mine Permitted Areas
- Surface Water
- Provincial Park

Management Units

- MU-1
- MU-2
- MU-3
- MU-4
- MU-5
- MU-6

Notes:
1. Original in colour.
2. Site location is approximate.

References:
1. Data provided by Teck Coal Ltd.
2. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Revisons:
0 - AO - 2019-04-11 - DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 2 4 8 12 16 20 km

PROJECT LOCATION: Teck Coal Ltd

CLIENT NAME: Elk Valley, BC

SNC·LAVALIN

Site Location and Managment Units

CHK'D: STH	DATE: 2019/05/14	SCALE: 1:350,000	Ref Num:	REV: 1
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		661460-301	

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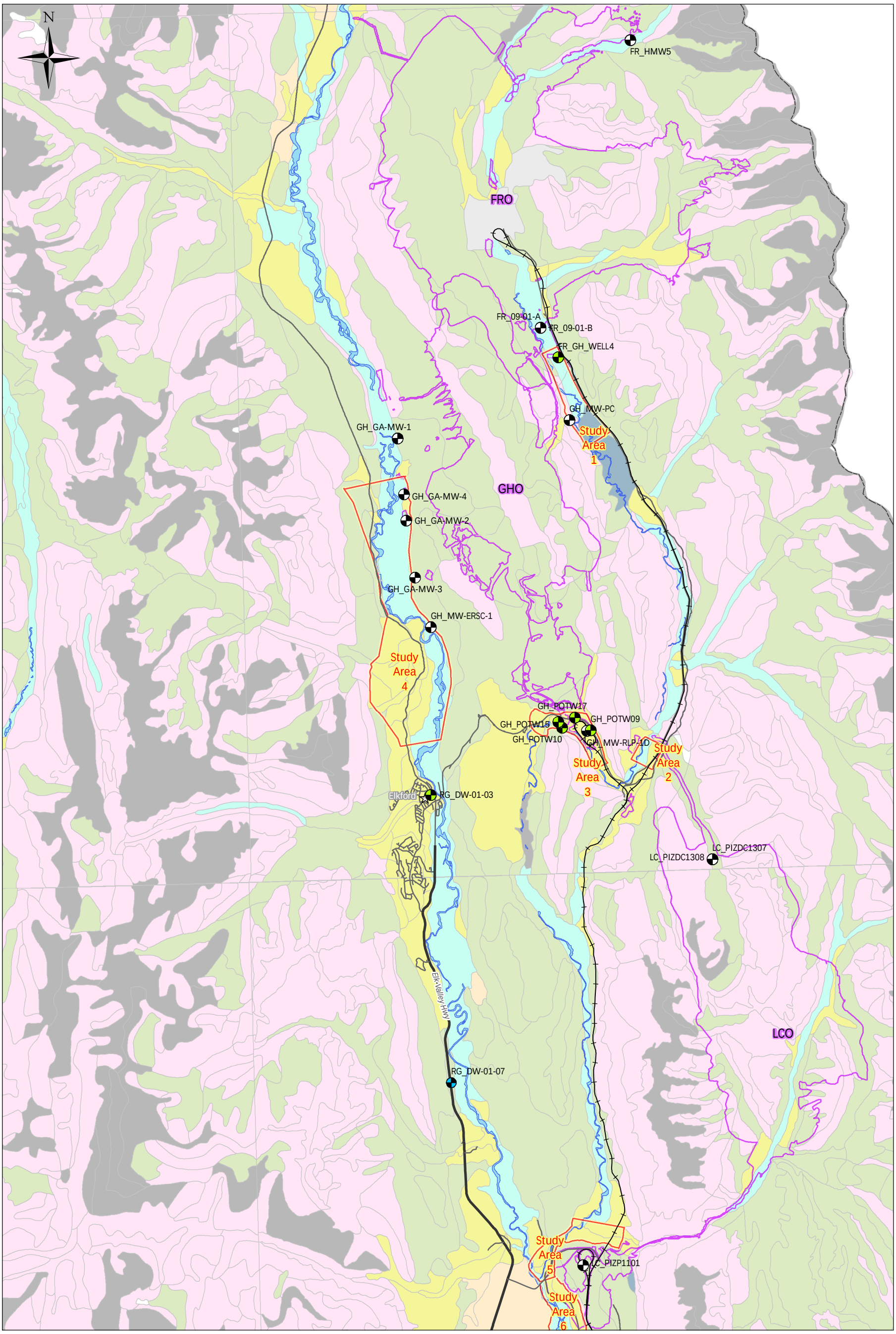

Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well
- BC-Alberta Border
- Rails
- Highway
- Secondary Road

Site Features
- Study Areas
- Mine Permitted Areas
- Surface Water

Surficial Unit
- Anthropogenic
- Colluvium
- Fluvial
- Glaciofluvial
- Glaciolacustrine
- Rock Outcrop
- Till
- Organic Soil

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Data provided by Teck Coal Ltd.
2. Service Layer Credits:
3. George, H., W.A. Gorman, and D.F. VanDine, 1987. Late quaternary geology and geomorphology of the Elk Valley, southeastern British Columbia. Canadian Journal of Earth Science, 24, 741-751

Revisons:
0 - AO - 2019-04-17- DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.75 1.5 3 4.5 6 7.5 km

PROJECT LOCATION: Teck Coal Ltd

CLIENT NAME: Elk Valley, BC

SNC·LAVALIN

Surficial Geology - North Half of Study Area

CHK'D: STH | DATE: 2019/05/15 | SCALE: 1:120,000 | Ref Num: 661460-302 | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N

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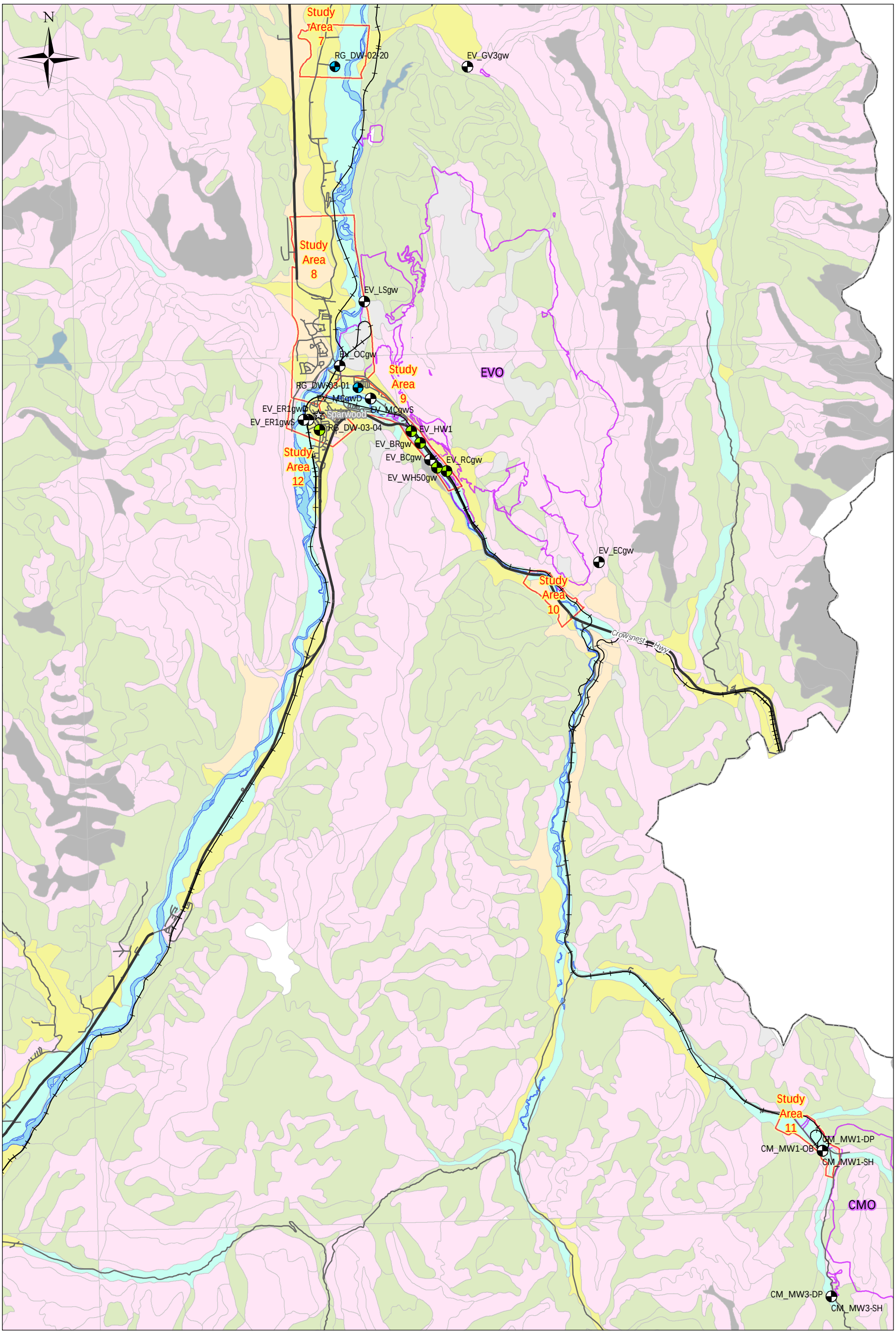

Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well
- BC-Alberta Border
- Rails
- Highway
- Secondary Road

Site Features
- Study Areas
- Mine Permitted Areas
- Surface Water

Surficial Unit
- Anthropogenic
- Colluvium
- Fluvial
- Glaciofluvial
- Glaciolacustrine
- Rock Outcrop
- Till
- Organic Soil

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Data provided by Teck Coal Ltd.
2. Service Layer Credits:
3. George, H., W.A. Gorman, and D.F. VanDine, 1987. Late quaternary geology and geomorphology of the Elk Valley, southeastern British Columbia. Canadian Journal of Earth Science, 24, 741-751

Revisons:
0 - AO - 2019-04-17- DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.75 1.5 3 4.5 6 7.5 km

PROJECT LOCATION: Teck Coal Ltd

CLIENT NAME: Elk Valley, BC

SNC·LAVALIN

Surficial Geology- South Half of Study Area

CHK'D: STH	DATE: 2019/05/15	SCALE: 1:120,000	Ref Num:	REV: 1
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		661460-303	

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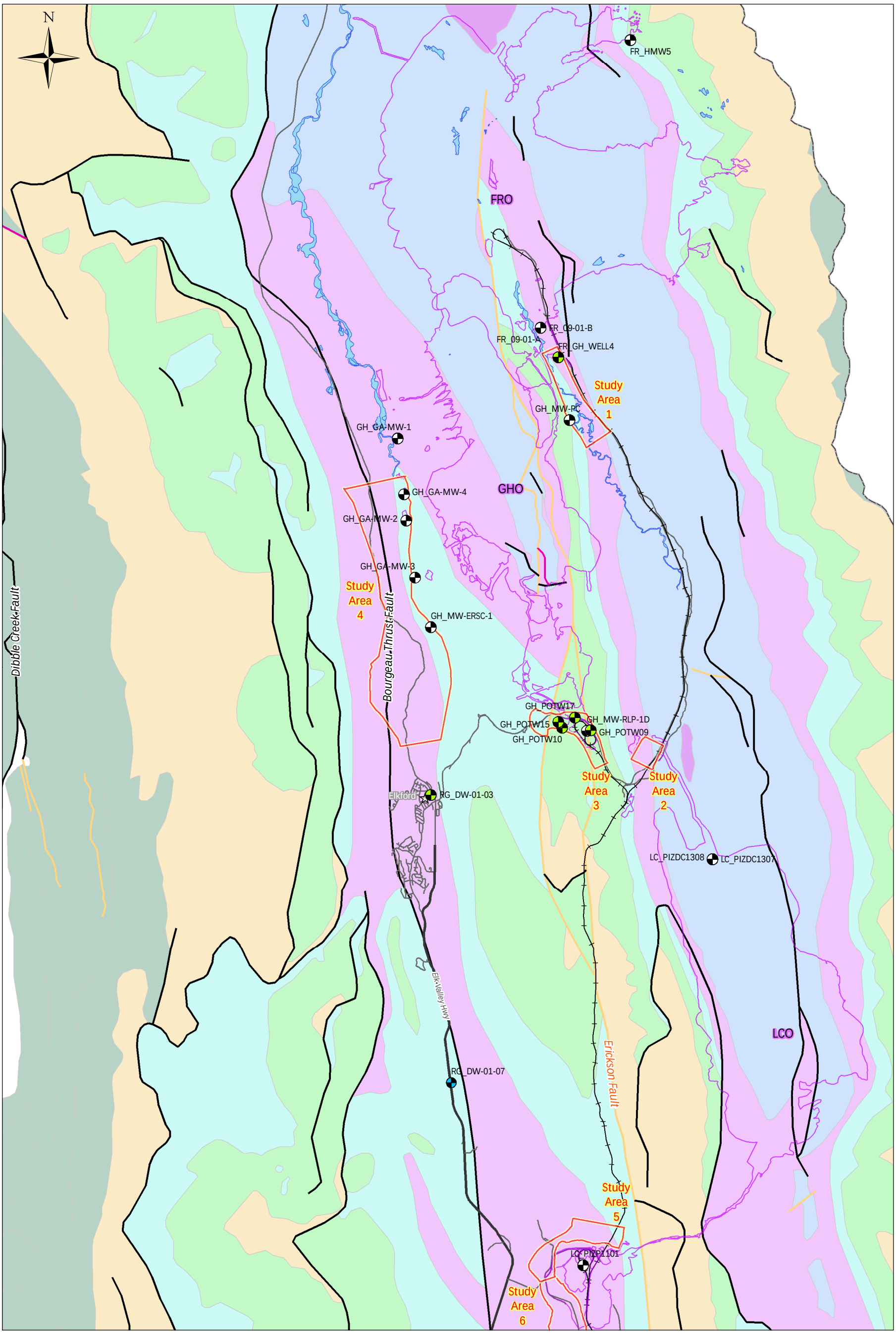

Groundwater Stations

- Monitoring Well
- Supply Well
- Domestic Well
- BC-Alberta Border
- Study Areas
- Mine Permitted Areas
- Rails
- Highway
- Secondary Road
- Surface Water

Bedrock Geology

- Blairmore Group
- Kootenay Group
- Fernie Formation
- Spray River Group
- Rocky Mountain Formation
- Rundle Group
- Other

Fault Type

- Fault
- Normal fault
- Thrust fault

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Data provided by Teck Coal Ltd.
2. Service Layer Credits:
3. Massey, N.W.D., MacIntyre, D.G., Desjardins, P.J., and Cooney, R.T. (2005): Geology of British Columbia, BC Ministry of Energy, Mines and Petroleum Resources, Geoscience Map 2005-3, (3 sheets), scale 1:1 000 000.

Revisons:
0 - AO - 2019-04-25 - DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.5 1 2 3 4 5 km

PROJECT LOCATION: Teck Coal Ltd

CLIENT NAME: Elk Valley, BC

SNC·LAVALIN

Bedrock Geology- North Half of Study Area

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1:120,000 | Ref Num: 661460-304 | REV: 1

BY: AO | COORD SYS: NAD 1983 UTM Zone 11N

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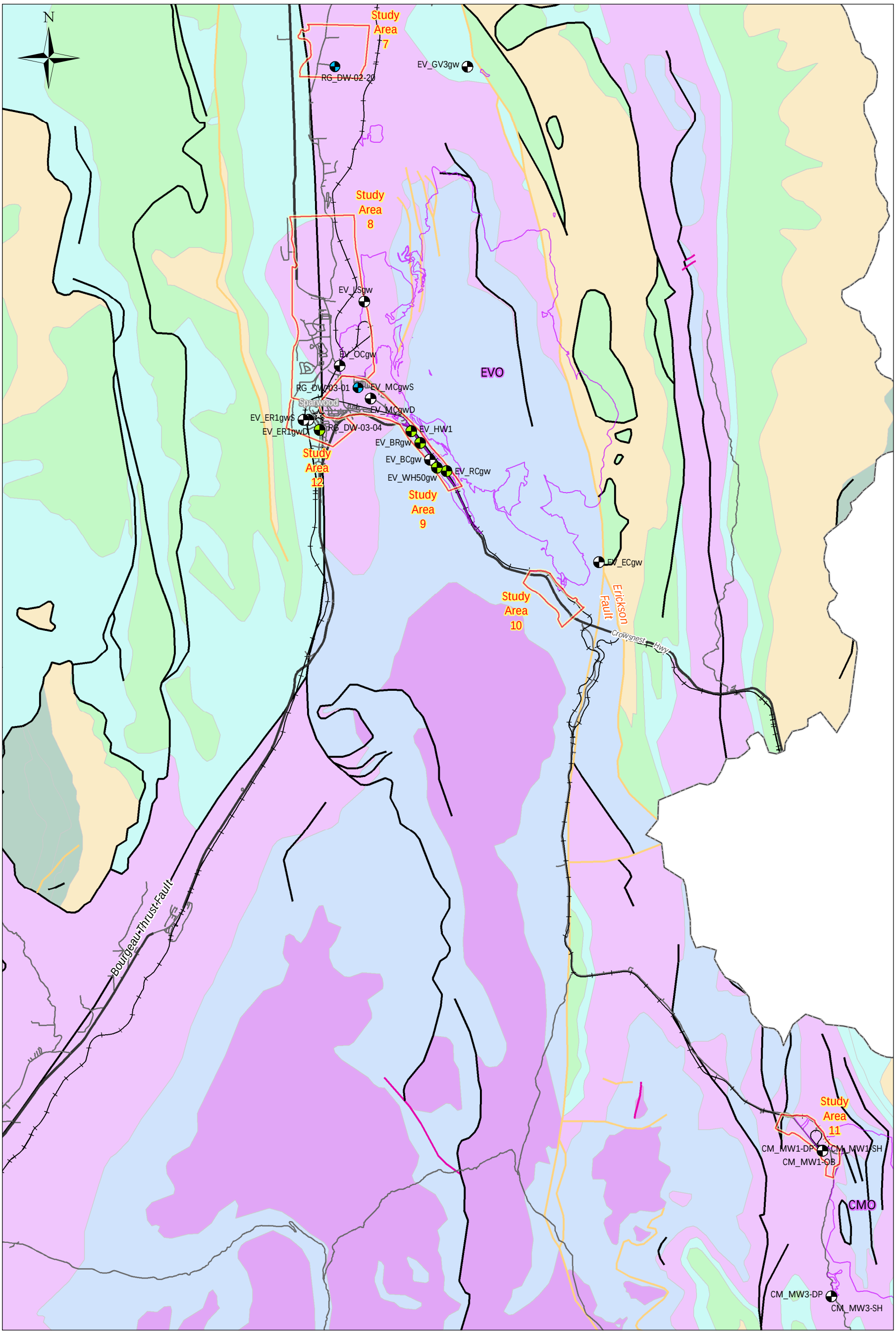

Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well
- BC-Alberta Border
- Study Areas
- Mine Permitted Areas
- Rails
- Highway
- Secondary Road

Bedrock Geology
- Blairmore Group
- Kootenay Group
- Fernie Formation
- Spray River Group
- Rocky Mountain Formation
- Rundle Group
- Other

Fault Type
- Fault
- Normal fault
- Thrust fault

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Data provided by Teck Coal Ltd.
2. Service Layer Credits:
3. Massey, N.W.D., MacIntyre, D.G., Desjardins, P.J., and Cooney, R.T. (2005): Geology of British Columbia, BC Ministry of Energy, Mines and Petroleum Resources, Geoscience Map 2005-3, (3 sheets), scale 1:1 000 000.

Revisons:
0 - AO - 2019-04-25 - DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.5 1 2 3 4 5 km

PROJECT LOCATION: Teck Coal Ltd

CLIENT NAME: Elk Valley, BC

SNC·LAVALIN

Bedrock Geology- South Half of Study Area

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1:120,000 | Ref Num: 661460-305 | REV: 1

BY: AO | COORD SYS: NAD 1983 UTM Zone 11N

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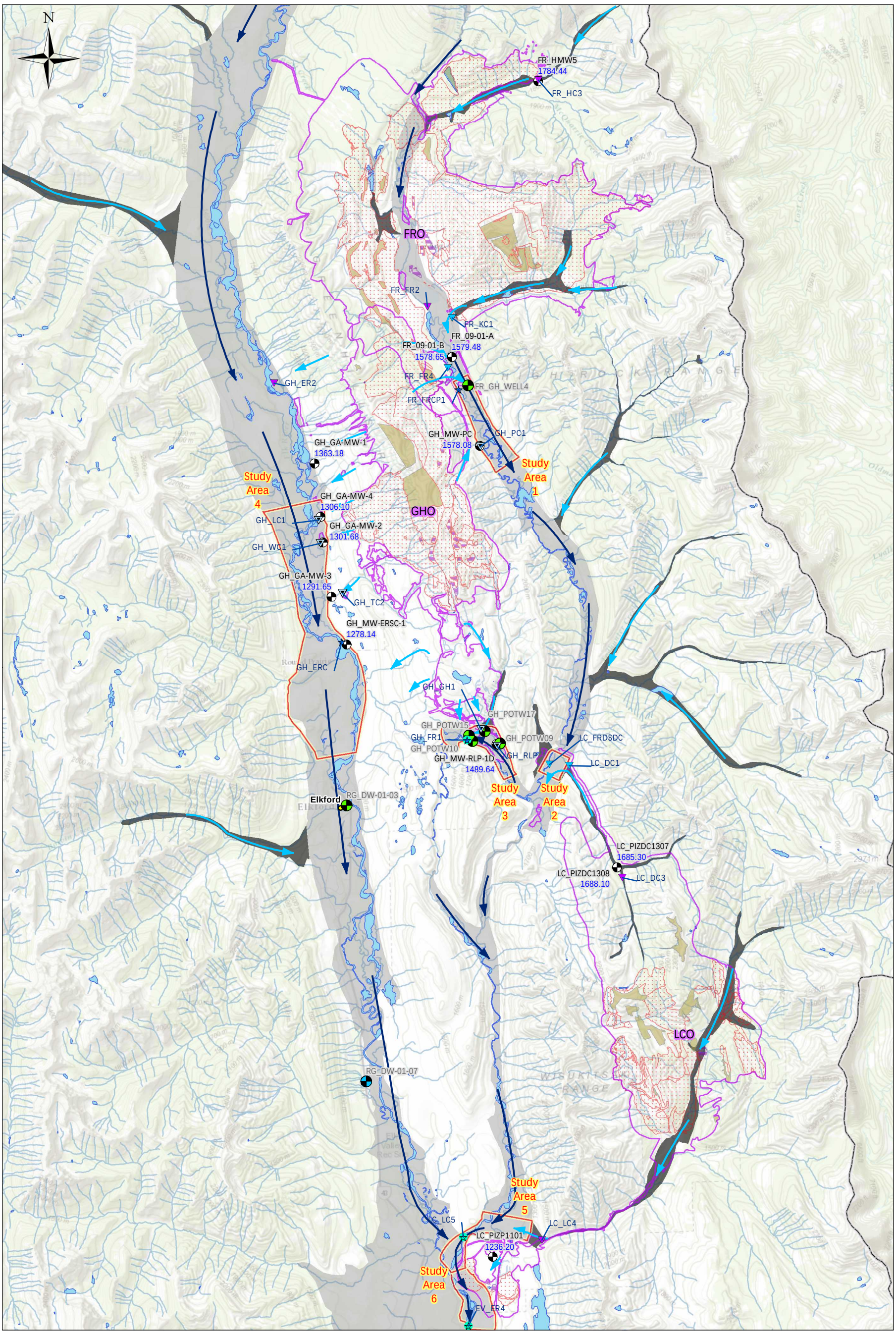

Legend

Groundwater Stations
- Domestic Well not monitored
- Monitoring Well
- Supply Well not monitored

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring
- Inferred Valley-Bottom Flow Direction
- Inferred Upland or Tributary Valley-bottom Groundwater Flow
- BC-Alberta Border

Site Features
- Study Areas
- Mine Permitted Areas
- Pit
- Stockpiles
- Waste Dump (Spoils)

Water Features
- Water Features
- Rivers
- Interpreted Tributary Valley-bottom Extent
- Interpreted Main Valley-bottom Extent
- 1287.77 Groundwater Elevation (masl) measured in 2018 Q4

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Data provided by Teck Coal Ltd.
2. Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Revisons:
0 - AO - 2019-04-11 - DRAFT -STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.75 1.5 3 4.5 6 7.5 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Groundwater Elevations from Q4 and Conceptual Regional Groundwater Flow - North Half of Study Area

CHK'D: STH	DATE: 2019/05/16	SCALE: 1:120,000	Ref Num: 661460-306 REV: 1
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		

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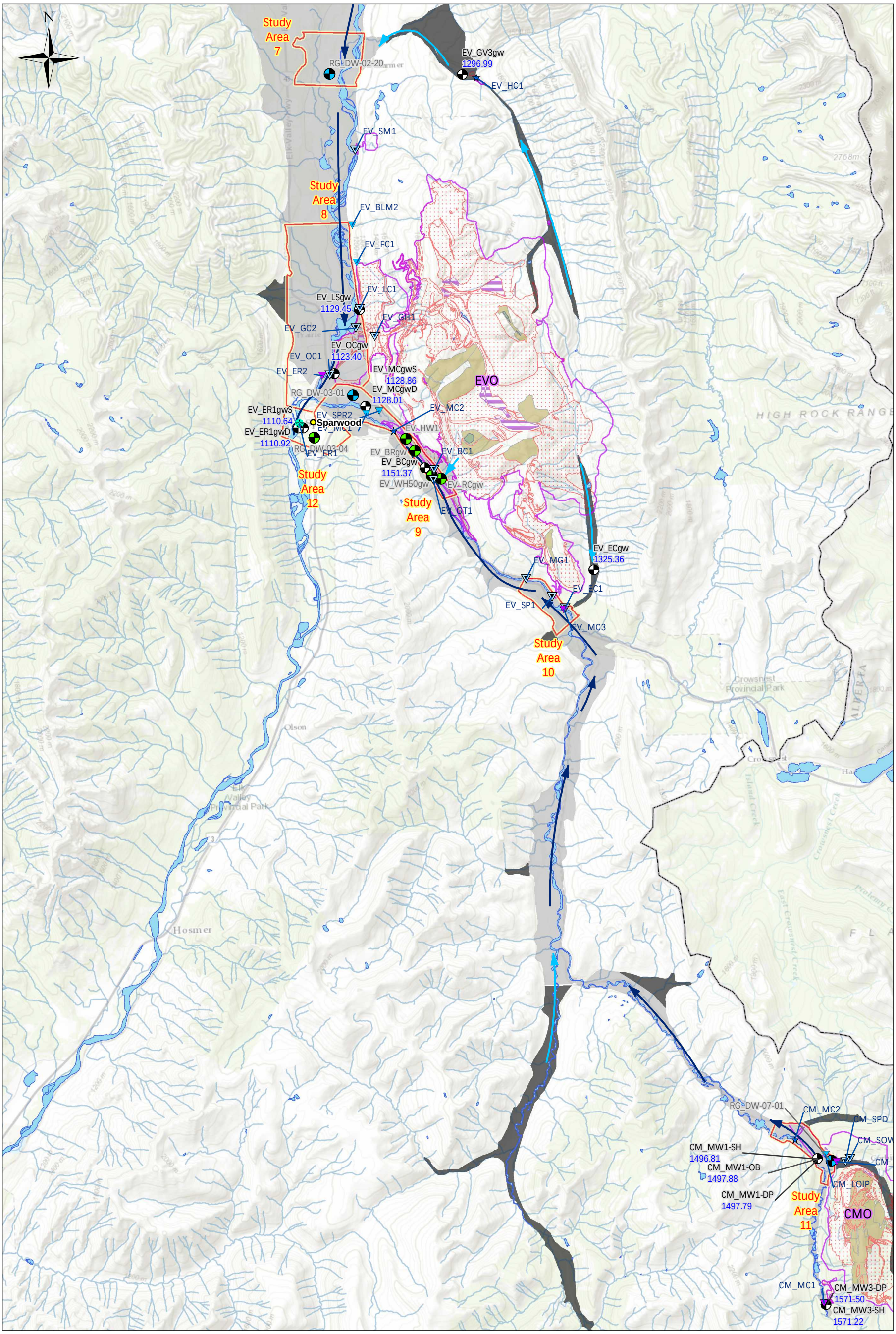

Legend

Groundwater Stations
- Domestic Well not monitored
- Monitoring Well
- Supply Well not monitored

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring
- Inferred Valley-Bottom Flow Direction
- Inferred Upland or Tributary Valley-bottom Groundwater Flow
- 1287.77 Groundwater Elevation (masl) measured in 2018 Q4
- BC-Alberta Border

Site Features
- Study Areas
- Mine Permitted Areas
- Pit
- Stockpiles
- Waste Dump (Spoils)

Water Features
- Water Features
- Rivers
- Interpreted Tributary Valley-bottom Extent
- Interpreted Main Valley-bottom Extent

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Data provided by Teck Coal Ltd.
2. Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Revisons:
0 - AO - 2019-04-11 - DRAFT -STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.75 1.5 3 4.5 6 7.5 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Groundwater Elevations from Q4 and Conceptual Regional Groundwater Flow - South Half of Study Area

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1:120,000 | Ref Num: 661460-307 | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N

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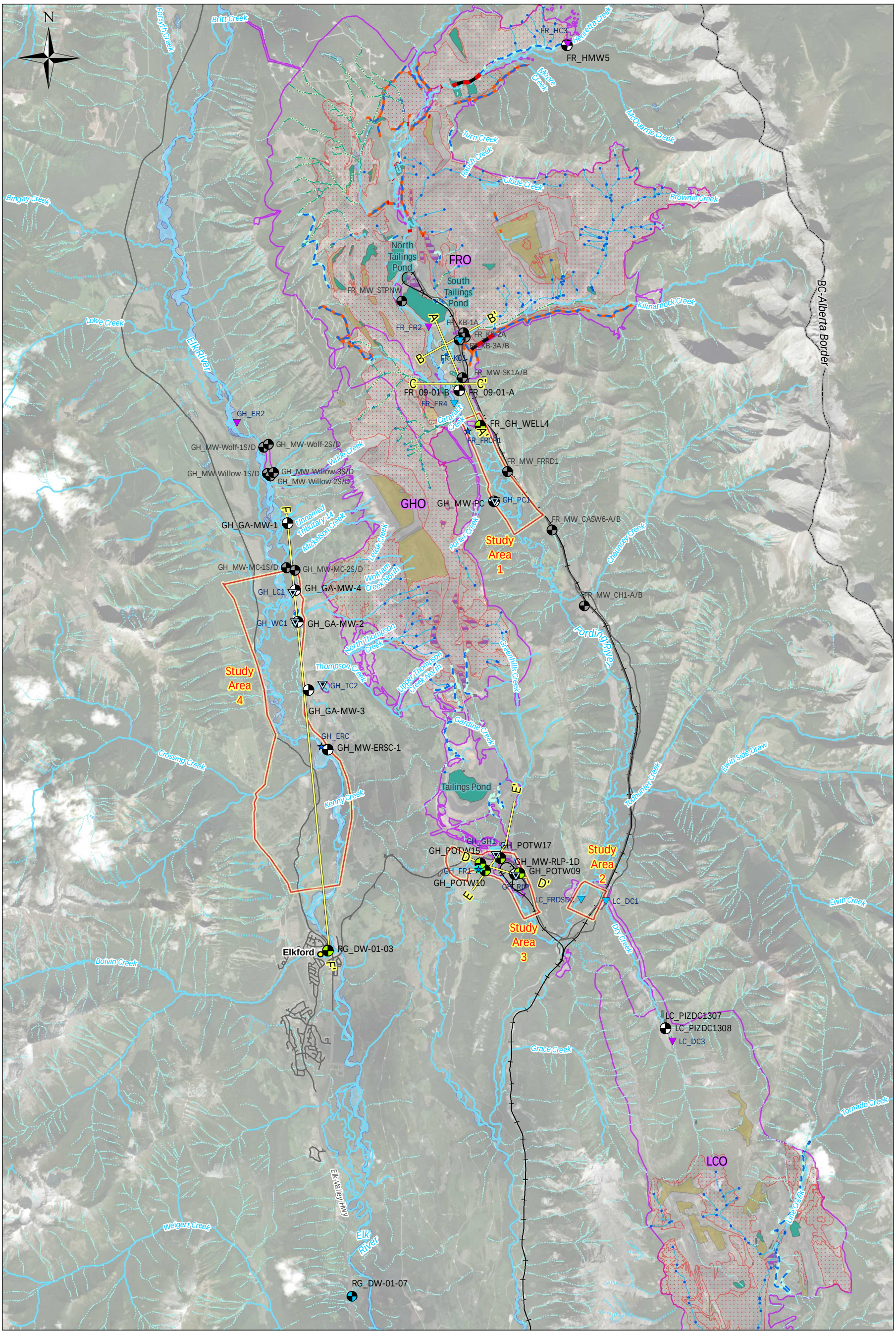
Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport



Surface Water Stations
- Compliance Point
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well
- Wells not included in the RGMP

Site Features
- Study Areas
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Geological Cross Section
- BC-Alberta Border
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Highway
- Secondary Road
- Rails
- Mine Permitted Areas

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- River Bed
- Settling/Tailings Pond

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Readers are referred to the RGMP dated September 29, 2017 for the locations of all wells included in cross sections

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Revisons:
0 - AO - 2019-04-11 - DRAFT -STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.5 1 2 3 4 5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Study Areas 1 to 4 and Sample Location Plan

CHK'D: STH	DATE: 2019/05/16	SCALE: 1:100000	Ref Num:	REV: 1
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		661460-308	

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-308-311_StudyAreas.mxd

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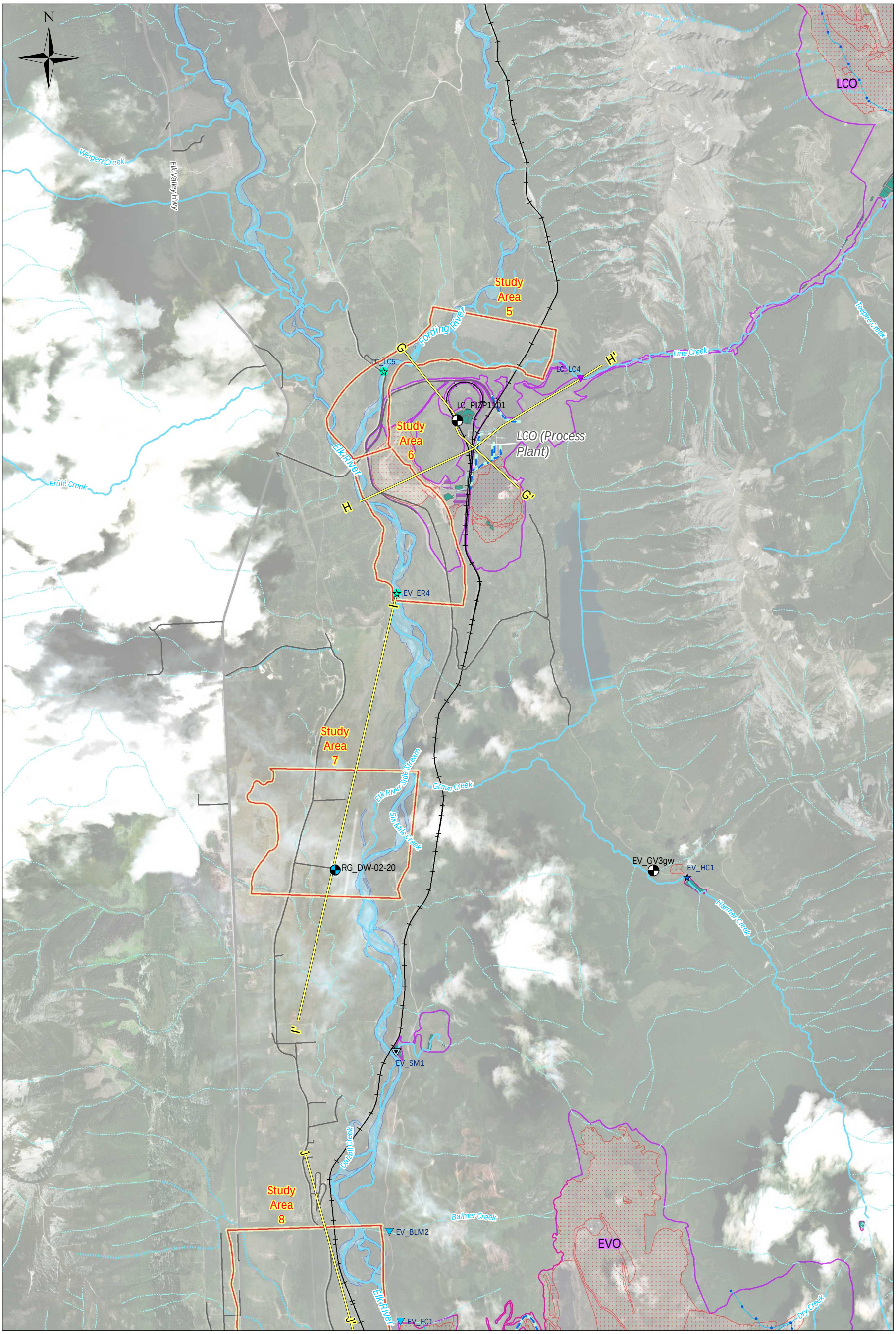

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring

Groundwater Stations
- Monitoring Well
- Domestic Well

Site Features
- Study Areas
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Geological Cross Section
- Highway
- Secondary Road
- Rails
- Mine Permitted Areas

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- River Bed
- Settling/Tailings Pond

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Readers are referred to the RGMP dated September 29, 2017 for the locations of all wells included in cross sections

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Revisons:
0 - AO - 2019-04-11 - DRAFT -STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Study Areas 5 to 7 and Sample Location Plan

CHK'D: STH	DATE: 2019/05/16 SCALE: 1: 50000	Ref Num:	REV: 1
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N	661460-309	

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-308-311_StudyAreas.mxd

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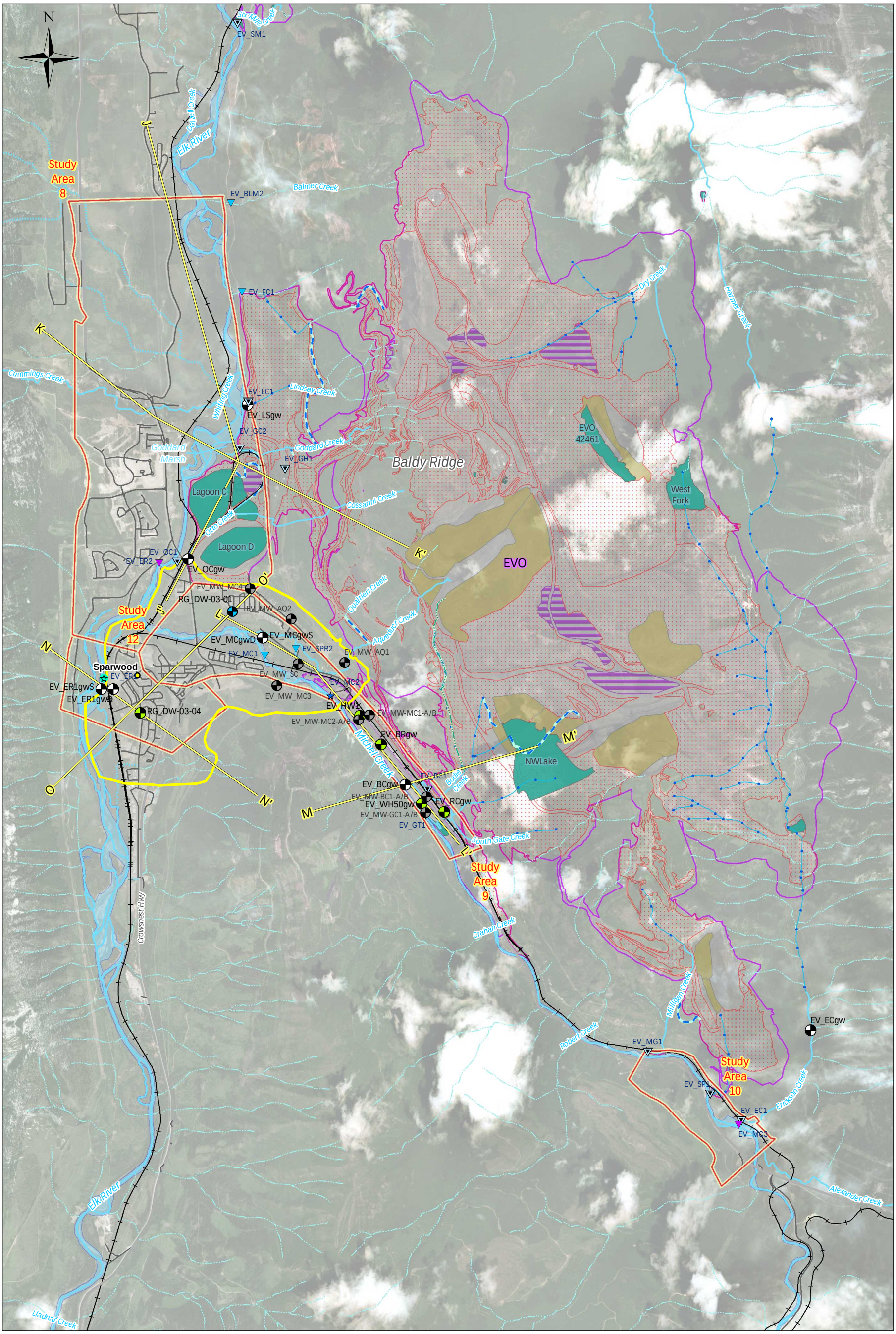

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring

Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well
- Wells not included in the RGMP

Site Features
- Study Areas
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Geological Cross Section
- Sparwood Area
- Rock Drain
- Highway
- Secondary Road
- Rails
- Mine Permitted Areas

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- River Bed
- Settling/Tailings Pond

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Readers are referred to the RGMP dated September 29, 2017 for the locations of all wells included in cross sections

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Revisons:
0 - AO - 2019-04-11 - DRAFT -STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Study Areas 8 to 10 and 12 and Sample

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1: 50000 | Ref Num: | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-310

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-308-311_StudyAreas.mxd

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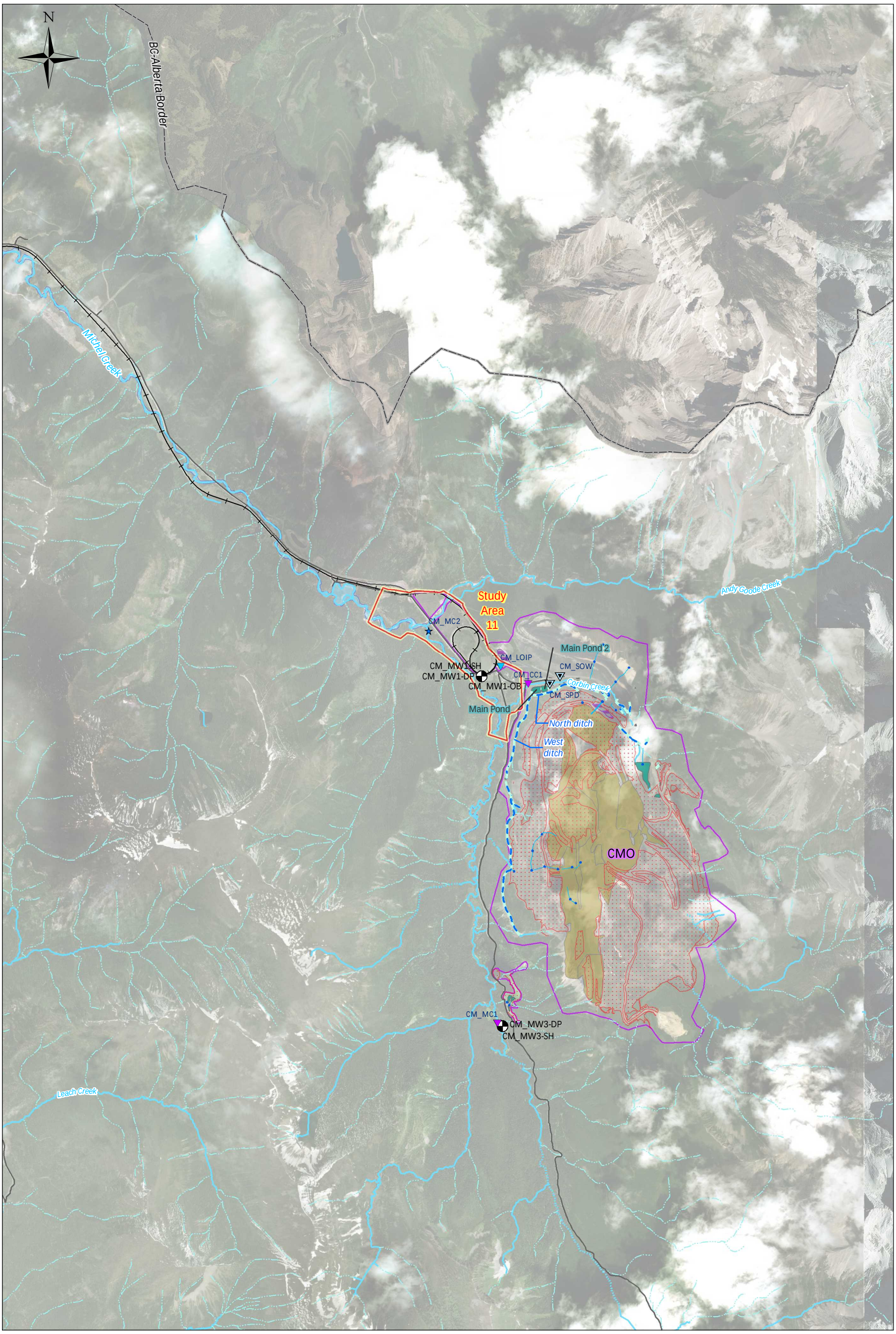

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Groundwater Stations
- Monitoring Well

Site Features
- Study Areas
- Pit
- Stockpiles
- Waste Dump (Spoils)
- BC-Alberta Border
- Secondary Road
- Rails
- Mine Permitted Areas

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- River Bed
- Settling/Tailings Pond

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Readers are referred to the RGMP dated September 29, 2017 for the locations of all wells included in cross sections

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Revisons:
0 - AO - 2019-04-11 - DRAFT -STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Study Area 11 and Sample Location Plan

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1: 50000 | Ref Num: | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-311

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-308-311_StudyAreas.mxd

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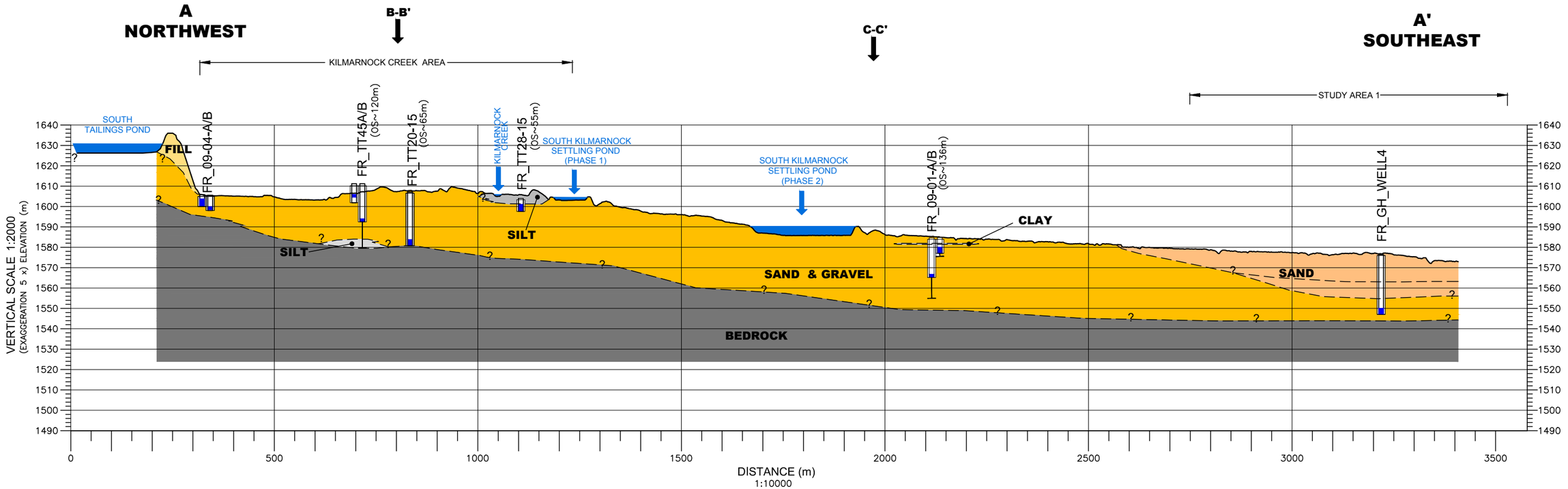


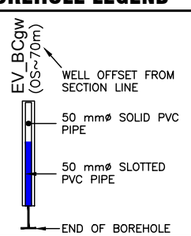
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

1. THE CROSS-SECTION DEPICTED IS BASED ON INTERPRETATION OF LIMITED GEOLOGICAL DATA. ACTUAL GEOLOGICAL CONDITIONS MAY BE DIFFERENT FROM THOSE INTERPRETED.
2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. Q4 GROUNDWATER ELEVATIONS WERE NOT AVAILABLE FOR FR_GH WELL 4.)
5. GROUND ELEVATION FOR TT-SERIES LOCATIONS WERE ESTIMATED FROM LIDAR. GROUNDWATER ELEVATIONS AT THESE LOCATIONS WERE CALCULATED USING THESE GROUND SURFACE ELEVATIONS.
6. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83.)

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

STUDY AREA 1
INFERRED GEOLOGICAL CROSS-SECTION A-A'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: REV.: 0
CHK'D: SH	PLOT: 20190515.0657	CADFILE:661460-X3R1	661460-312

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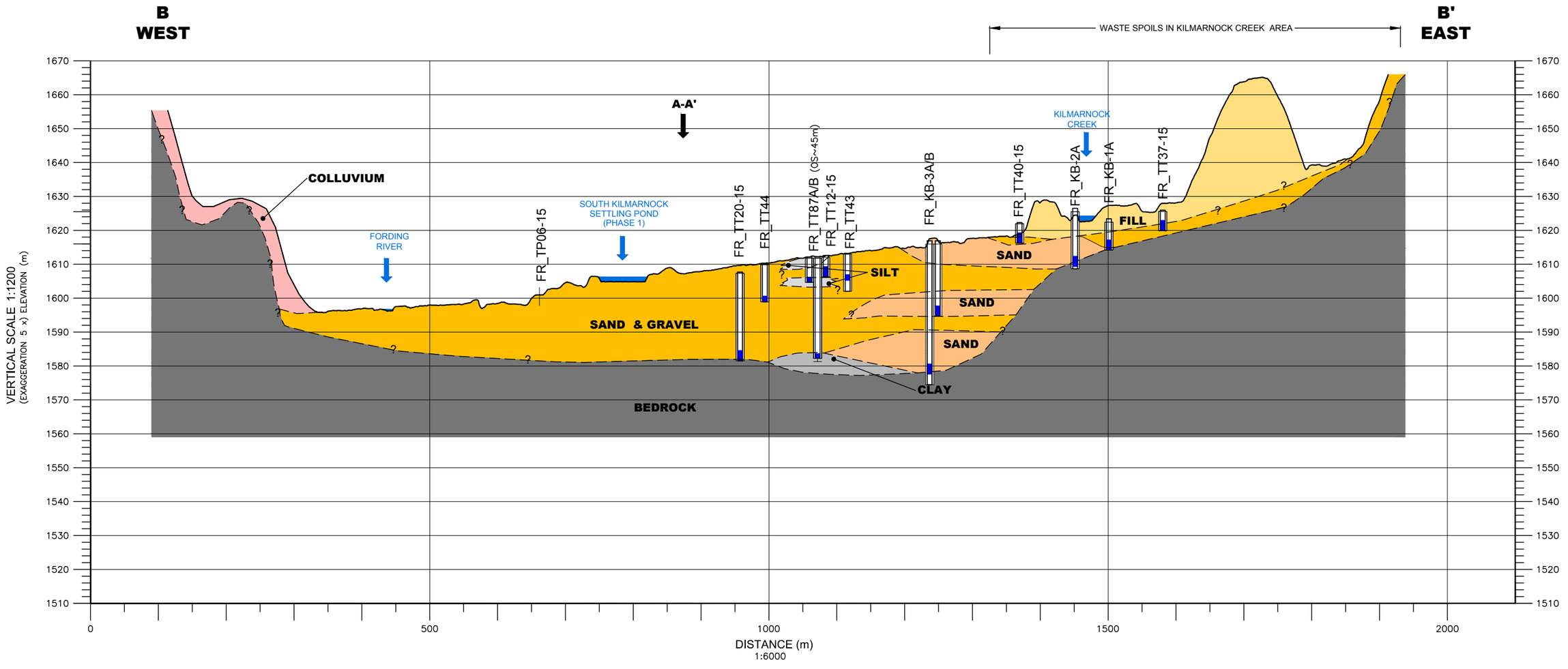


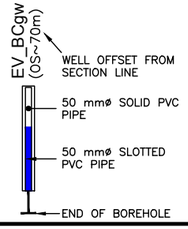
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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3. ORIGINAL DRAWING IN COLOUR.
4. GROUND ELEVATION FOR TT-SERIES LOCATIONS WERE ESTIMATED FROM LIDAR. GROUNDWATER ELEVATIONS AT THESE LOCATIONS WERE CALCULATED USING THESE GROUND SURFACE ELEVATIONS.
6. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83.)

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

STUDY AREA 1

INFERRED GEOLOGICAL CROSS-SECTION B-B'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: 661460-313 REV.: 0
CHK'D: SH	PLOT: 20190515.0657	CADFILE:661460-X3R1	

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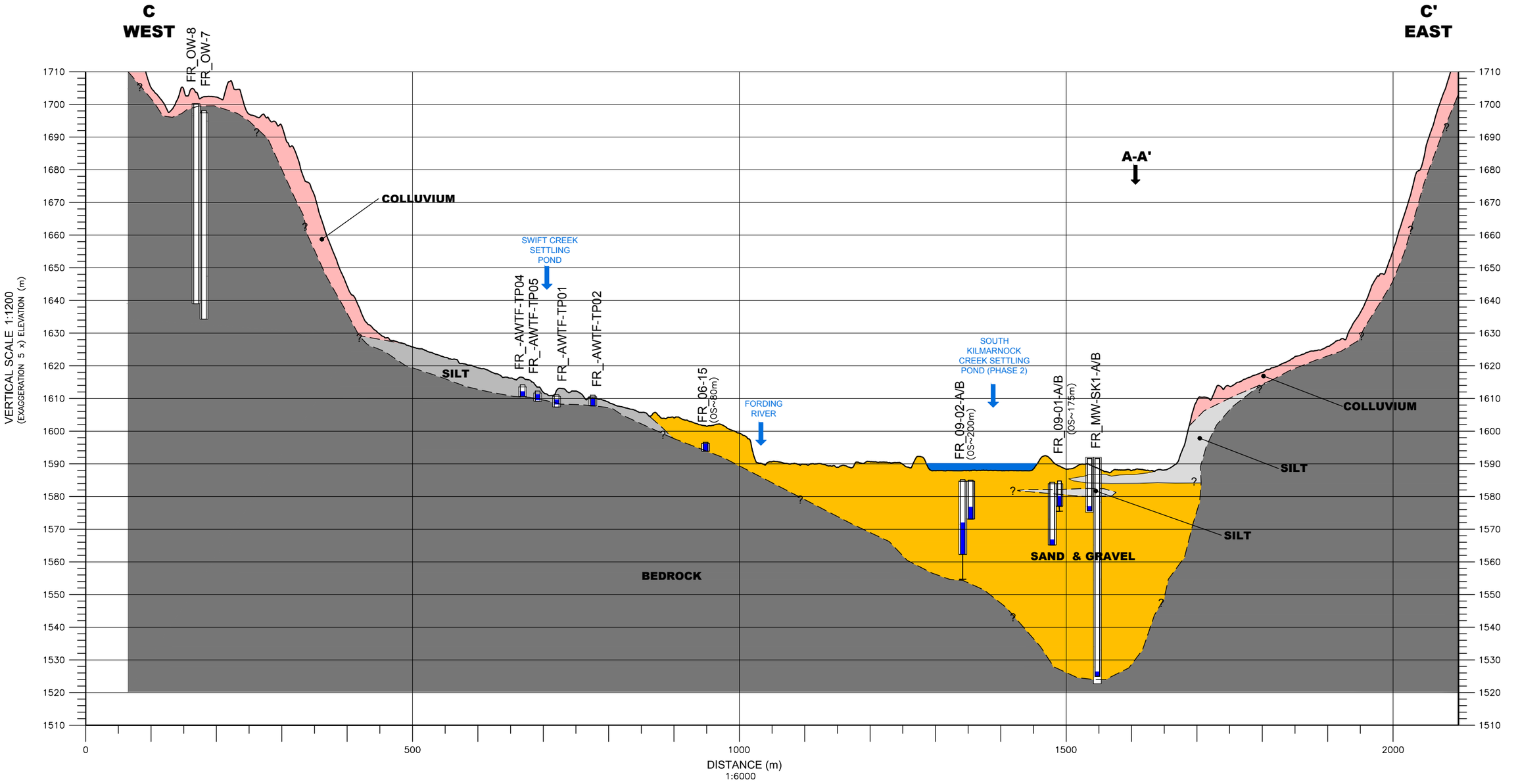


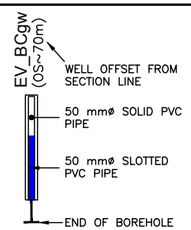
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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3. ORIGINAL DRAWING IN COLOUR.
4. GROUND ELEVATION FOR TT-SERIES LOCATIONS WERE ESTIMATED FROM LIDAR. GROUNDWATER ELEVATIONS AT THESE LOCATIONS WERE CALCULATED USING THESE GROUND SURFACE ELEVATIONS.
6. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83.)

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

STUDY AREA 1
INFERRED GEOLOGICAL CROSS-SECTION C-C'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: 661460-314 REV.: 0
CHK'D: SH	PLOT: 20190515.0657	CADFILE:661460-X3R1	

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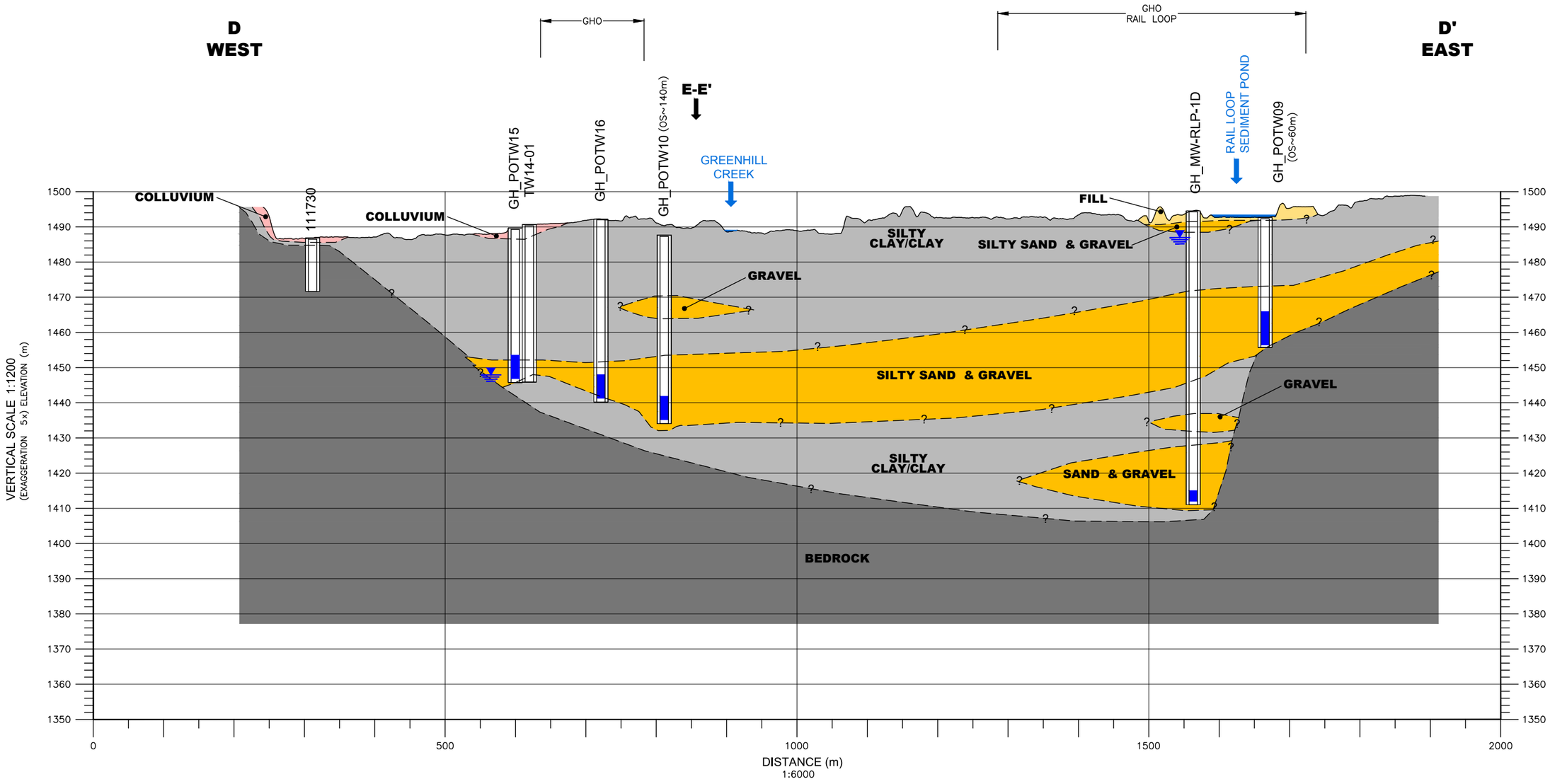


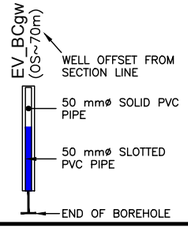
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

1. THE CROSS-SECTION DEPICTED IS BASED ON INTERPRETATION OF LIMITED GEOLOGICAL DATA. ACTUAL GEOLOGICAL CONDITIONS MAY BE DIFFERENT FROM THOSE INTERPRETED.
2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. DETAILED INSTALL RECORDS WERE NOT AVAILABLE FOR WELLS GH_POTW15, GH_POTW09 AND GH_POTW10. ESTIMATED 6m SCREEN.
5. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

STUDY AREA 3
INFERRED GEOLOGICAL CROSS-SECTION D-D'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: 661460-315 REV.: 0
CHK'D: SH	PLOT: 20190515.0657	CADFILE:661460-X3R1	

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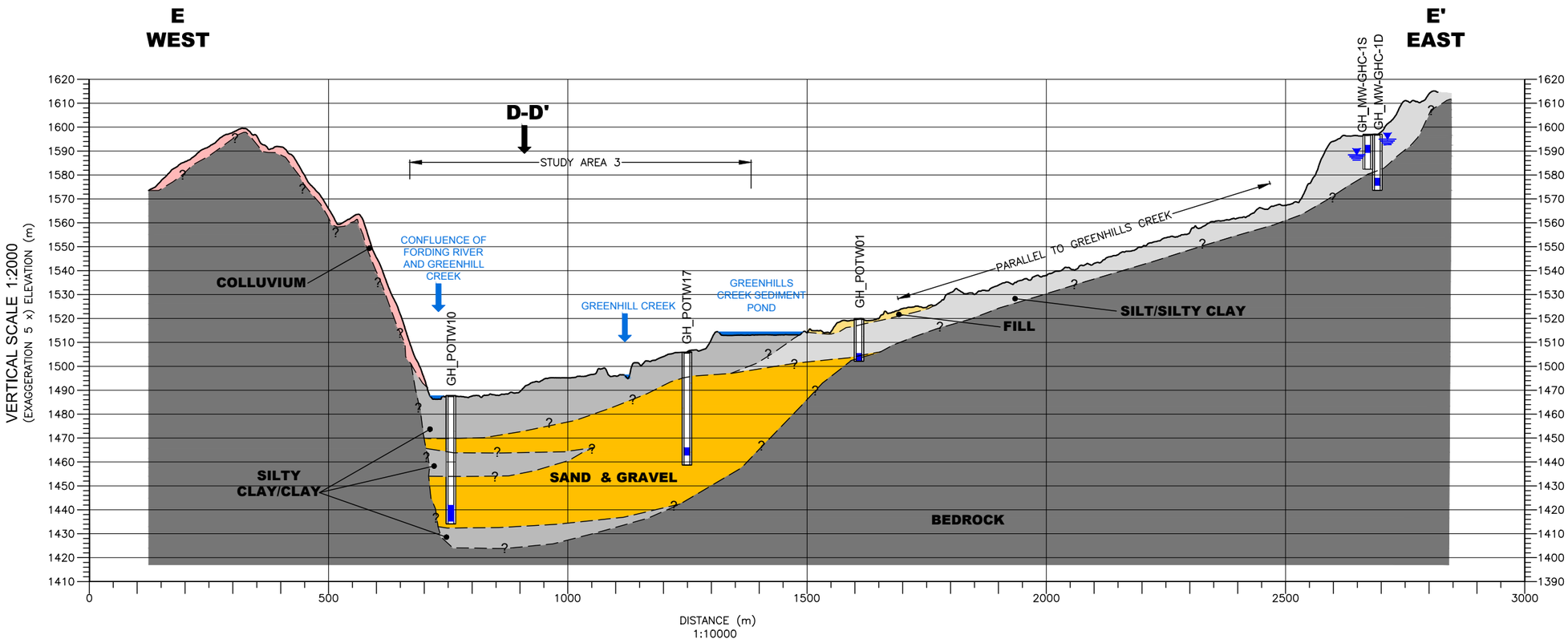


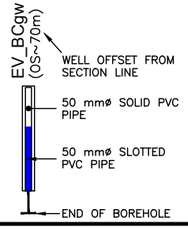
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. DETAILED INSTALL RECORDS WERE NOT AVAILABLE FOR WELL GH_POTW01 AND GH_POTW10. ESTIMATED 6m SCREEN.
5. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

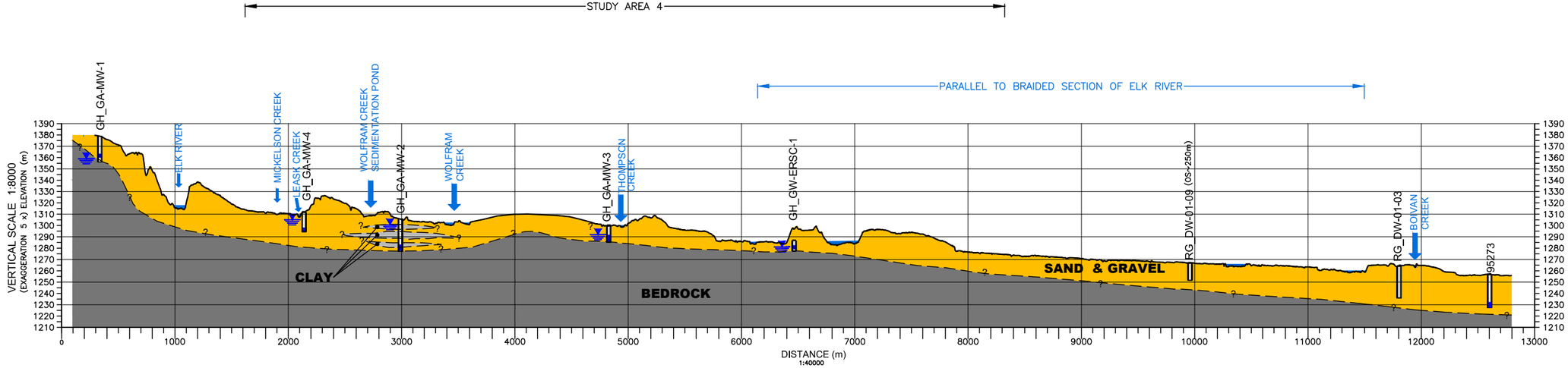
STUDY AREA 3
INFERRED GEOLOGICAL CROSS-SECTION E-E'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: 661460-316 REV.: 0
CHK'D: SH	PLOT: 20190515.0658	CADFILE:661460-X3R1	

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GIS\CAD\661460-X3R1.DWG

F
NORTH

F'
SOUTH



LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m)

- WELL OFFSET FROM SECTION LINE
- 50 mmø SOLID PVC PIPE
- 50 mmø SLOTTED PVC PIPE
- END OF BOREHOLE

NOTES

1. THE CROSS-SECTION DEPICTED IS BASED ON INTERPRETATION OF LIMITED GEOLOGICAL DATA. ACTUAL GEOLOGICAL CONDITIONS MAY BE DIFFERENT FROM THOSE INTERPRETED.
2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

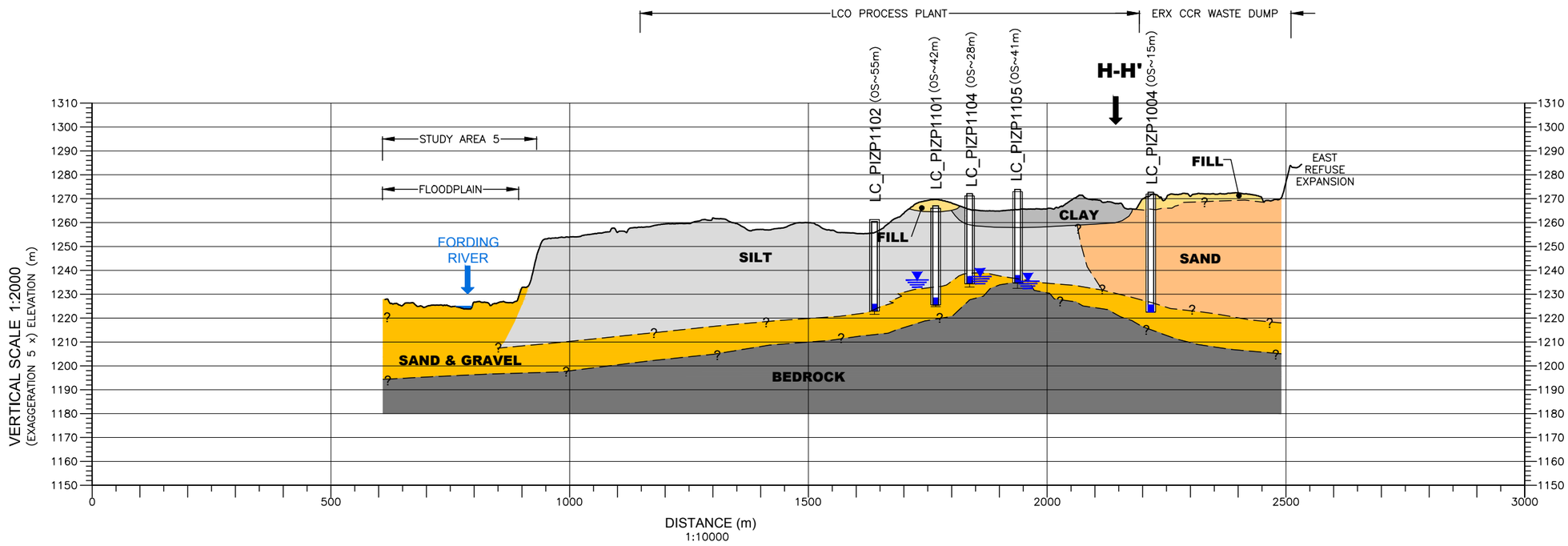
STUDY AREA 4
INFERRED GEOLOGICAL CROSS-SECTION F-F'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: 661460-317 REV.: 0
CHK'D: SH	PLOT: 20190515.0658	CADFILE:661460-X3R1	

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GIS\CAD\661460-X3R1.DWG

G
NORTHWEST

G'
SOUTHEAST



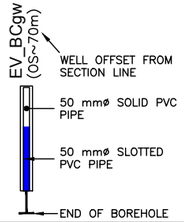
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

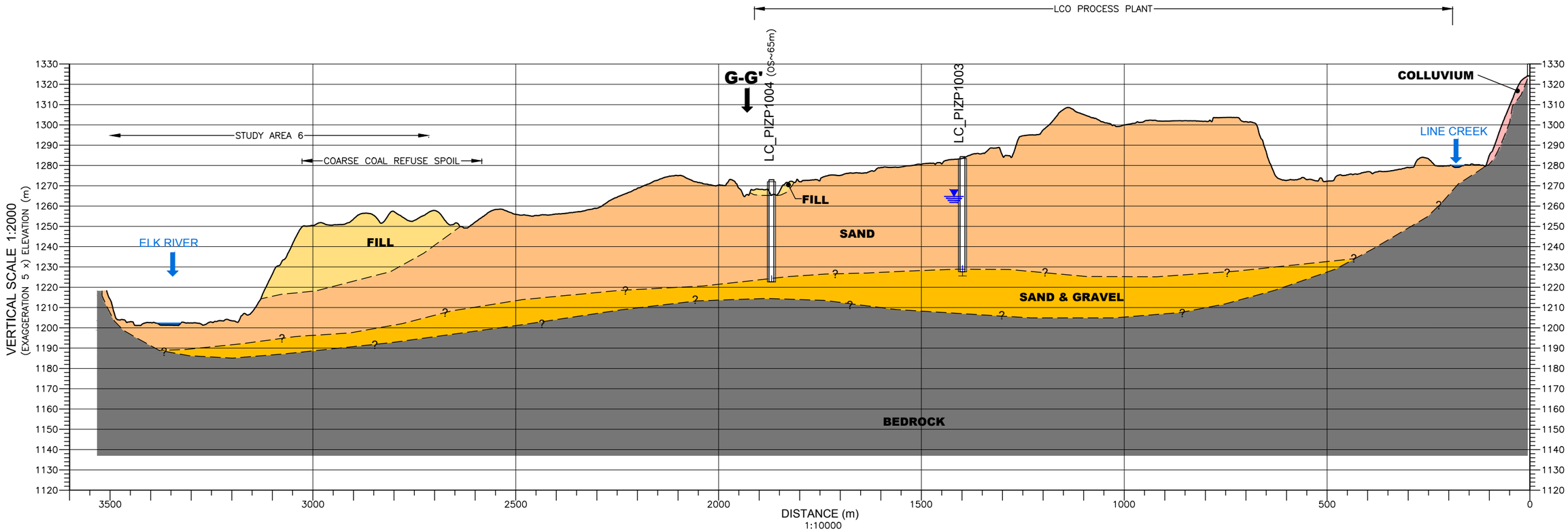
STUDY AREA 5/6
INFERRED GEOLOGICAL CROSS-SECTION G-G'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: REV.: 0
CHK'D: SH	PLOT: 20190515.0658	CADFILE:661460-X3R1	**661460-318**

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GIS\CAD\661460-X3R1.DWG

H
SOUTHWEST

H'
NORTHEAST



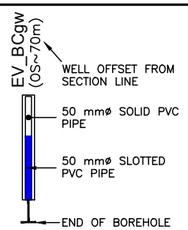
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.

REFERENCE DRAWINGS

–	–	–
DWG. NO.	DATE	DESCRIPTION

REVISIONS

0	2019–05–15	ISSUED TO CLIENT	AJK	SH
REV.	DATE	DESCRIPTION	BY	CHK

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

STUDY AREA 5/6
INFERRED GEOLOGICAL CROSS-SECTION H-H'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019–04–20	DWG No: 661460-319 REV.: 0
CHK'D: SH	PLOT: 20190515.0658	CADFILE:661460–X3R1	

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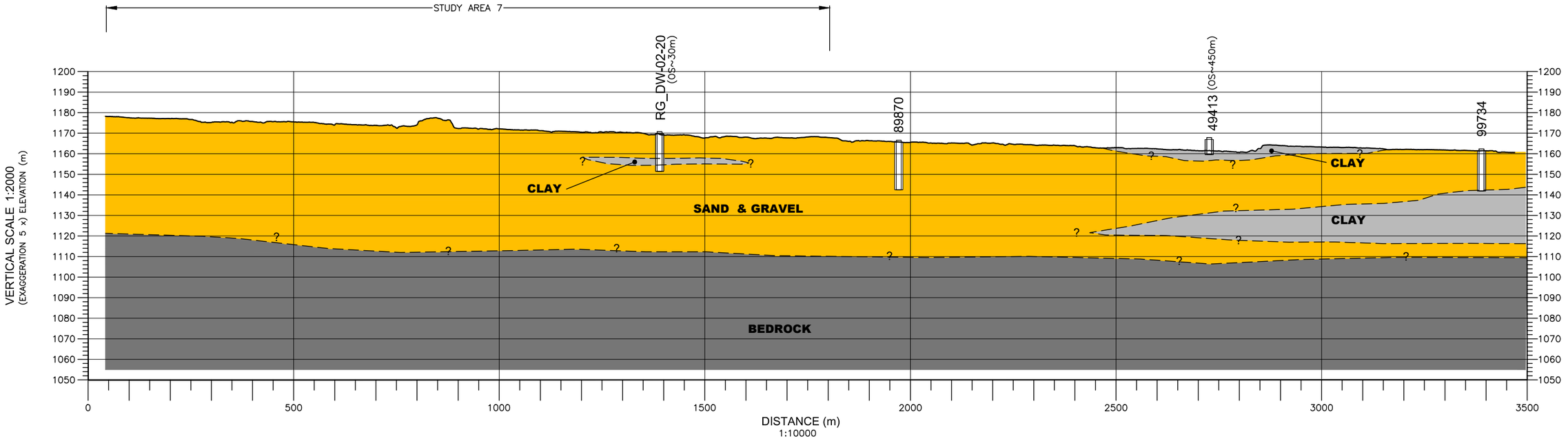
I
NORTH

I'
SOUTH

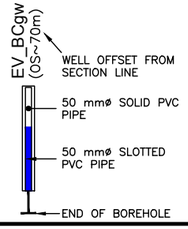


LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

BOREHOLE LEGEND



NOTES

1. THE CROSS–SECTION DEPICTED IS BASED ON INTERPRETATION OF LIMITED GEOLOGICAL DATA. ACTUAL GEOLOGICAL CONDITIONS MAY BE DIFFERENT FROM THOSE INTERPRETED. REFER TO PLAN MAP 626147–104 FOR LOCATION OF CROSS–SECTION LINE.
2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019–05–15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

STUDY AREA 7
INFERRED GEOLOGICAL CROSS-SECTION I-I'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019–04–20	DWG No: 661460-320 REV.: 0
CHK'D: SH	PLOT: 20190515.0658	CADFILE:661460–X3R1	

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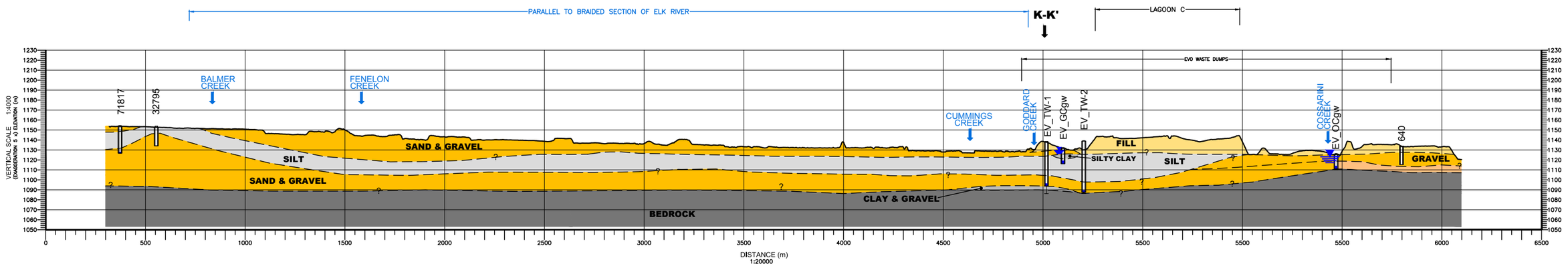
J
NORTH

J'
SOUTH



LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (0S~70m)

- WELL OFFSET FROM SECTION LINE
- 50 mmø SOLID PVC PIPE
- 50 mmø SLOTTED PVC PIPE
- END OF BOREHOLE

NOTES

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2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

STUDY AREA 8
INFERRED GEOLOGICAL CROSS-SECTION J-J'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: 661460-321 REV.: 0
CHK'D: SH	PLOT: 20190515.0658	CADFILE: 661460-X3R1	

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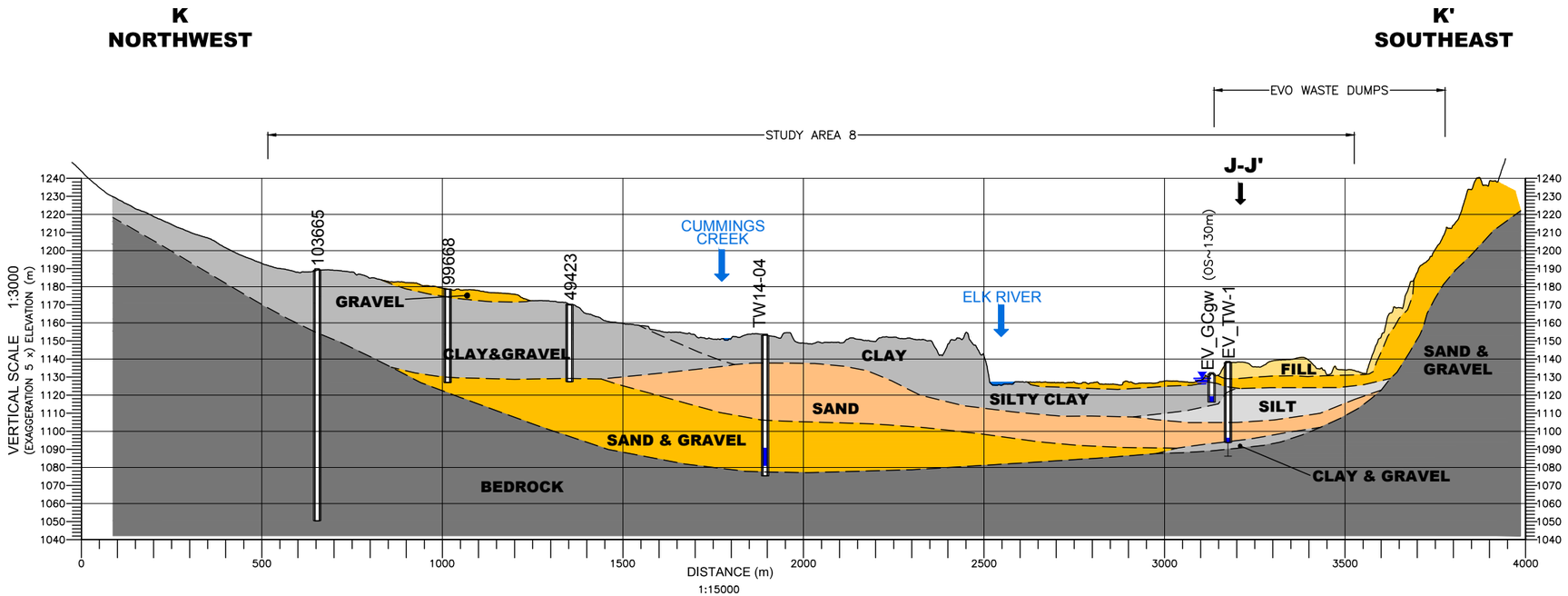


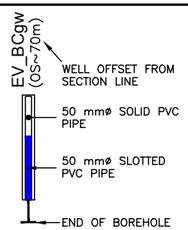
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

STUDY AREA 8
INFERRED GEOLOGICAL CROSS-SECTION K-K'

DWN BY: AJK | SCALE: AS SHOWN | DATE: 2019-04-20 | DWG No: 661460-322 | REV.: 0

CHK'D: SH | PLOT: 20190515.0658 | CADFILE: 661460-X3R1

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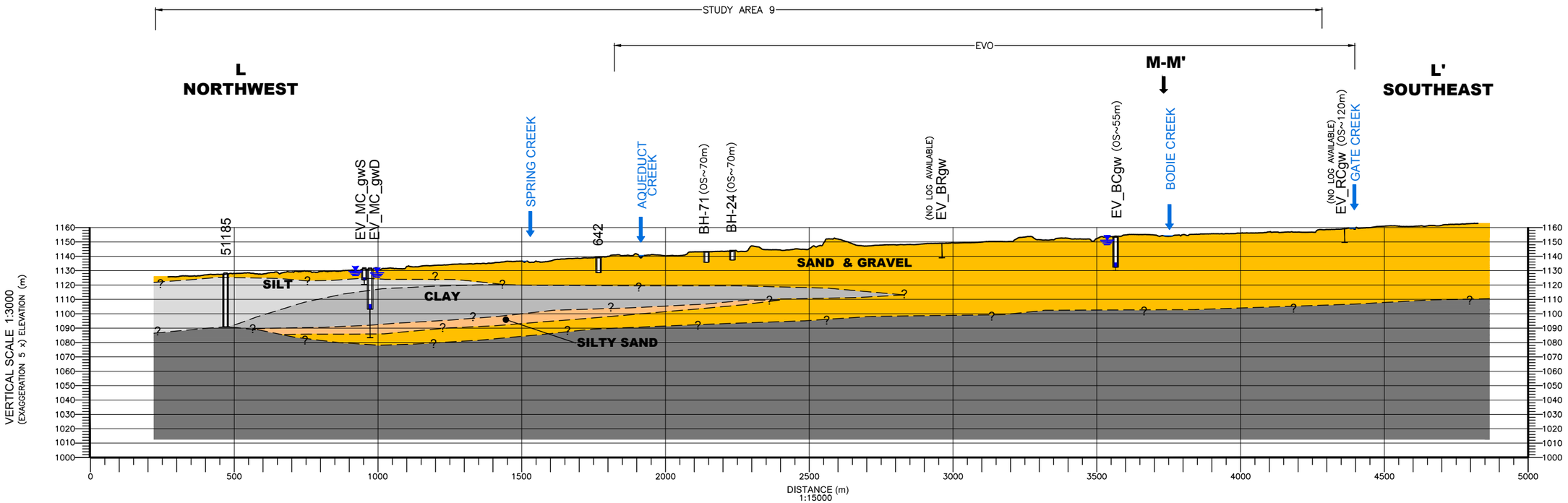


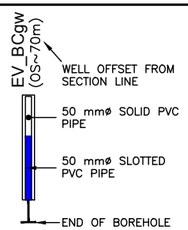
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

STUDY AREA 9
INFERRED GEOLOGICAL CROSS-SECTION L-L'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: 661460-323 REV.: 0
CHK'D: SH	PLOT: 20190515.0658	CADFILE:661460-X3R1	

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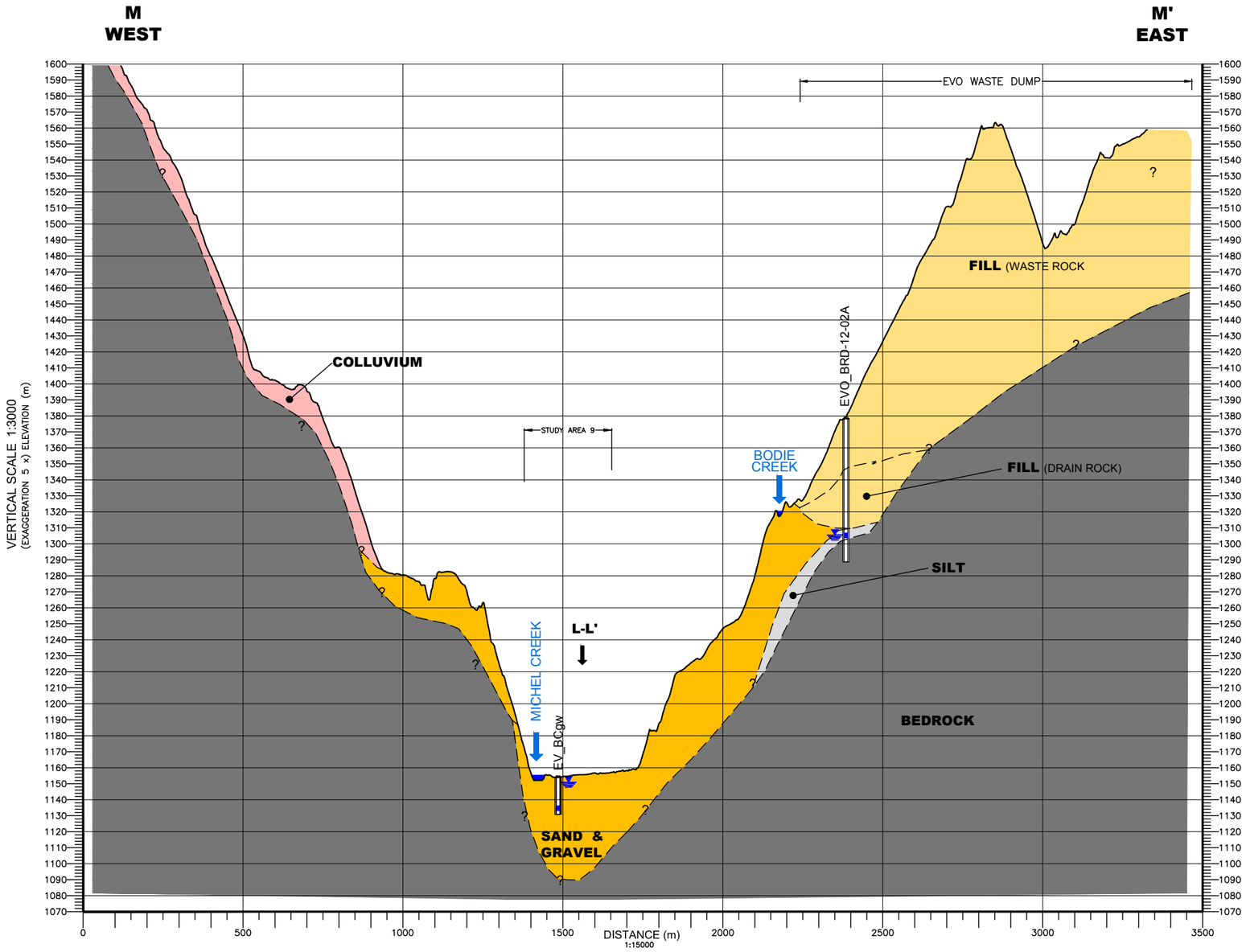


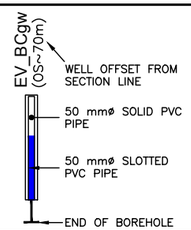
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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3. ORIGINAL DRAWING IN COLOUR.
4. GROUND ELEVATION FOR SECTIONS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.
5. DEPTH TO GROUNDWATER AT EVO_BRD-12-02A WAS MEASURED ON 2012/09/27.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

STUDY AREA 9
INFERRED GEOLOGICAL CROSS-SECTION M-M'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: 661460-324 REV.: 0
CHK'D: SH	PLOT: 20190515.0658	CADFILE:661460-X3R1	

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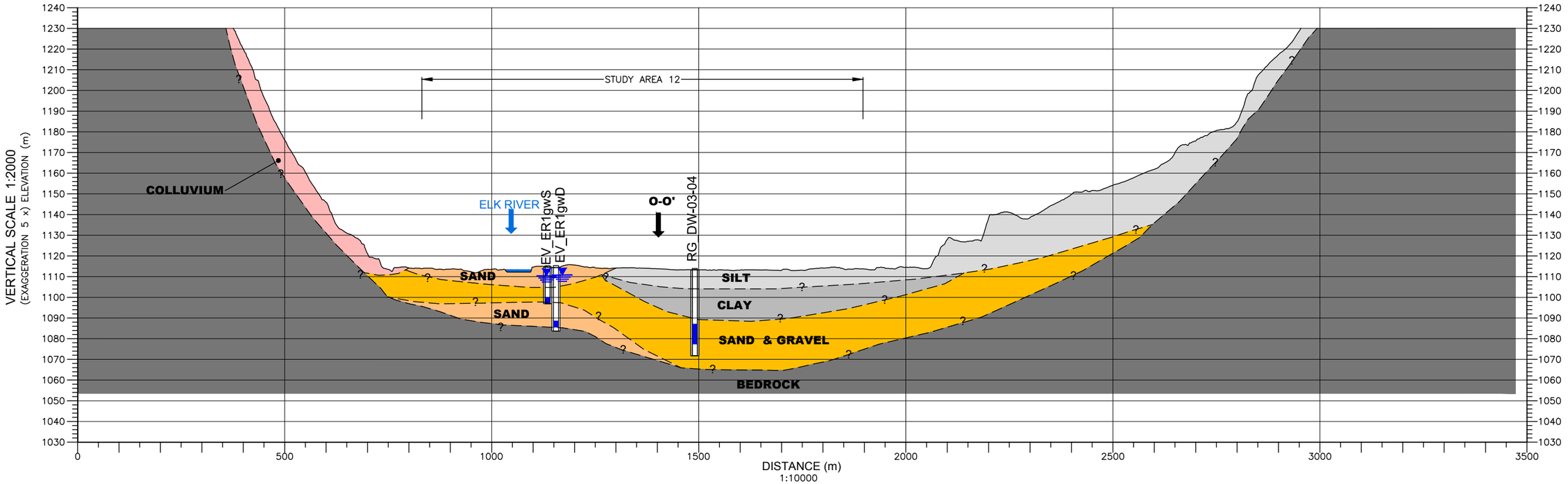
N
NORTHWEST

N'
SOUTHEAST



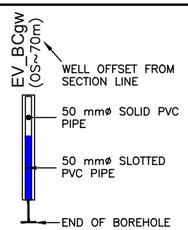
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2018 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



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REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:

STUDY AREA 12
INFERRED GEOLOGICAL CROSS-SECTION N-N'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: REV.: 0
CHK'D: SH	PLOT: 20190515.0658	CADFILE:661460-X3R1	661460-325

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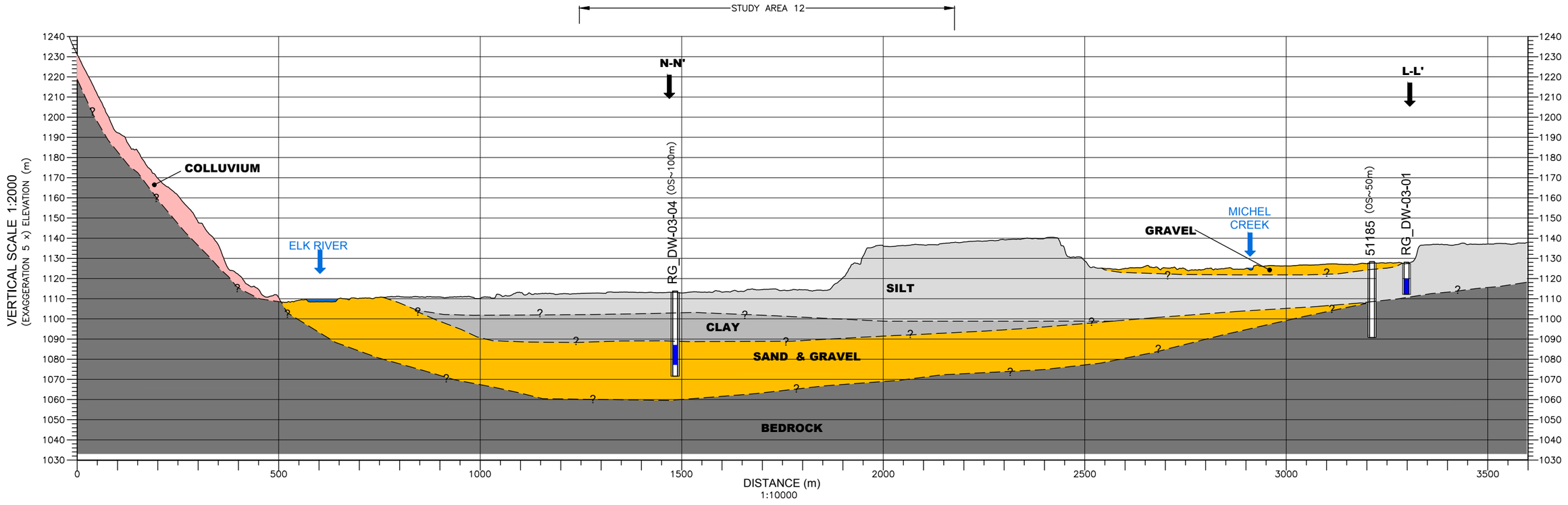
O
SOUTHWEST

O'
NORTHEAST

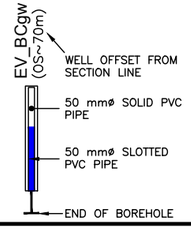


LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

— — — — INFERRED STRATIGRAPHIC BOUNDARY

BOREHOLE LEGEND



NOTES

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2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2019-05-15	ISSUED TO CLIENT	AJK	SH

SNC·LAVALIN

CLIENT NAME: TECK COAL LTD.

PROJECT LOCATION: ELK VALLEY BC

TITLE:
STUDY AREA 12
INFERRED GEOLOGICAL CROSS-SECTION O-O'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2019-04-20	DWG No: 661460-326 REV.: 0
CHK'D: SH	PLOT: 20190515.0658	CADFILE:661460-X3R1	

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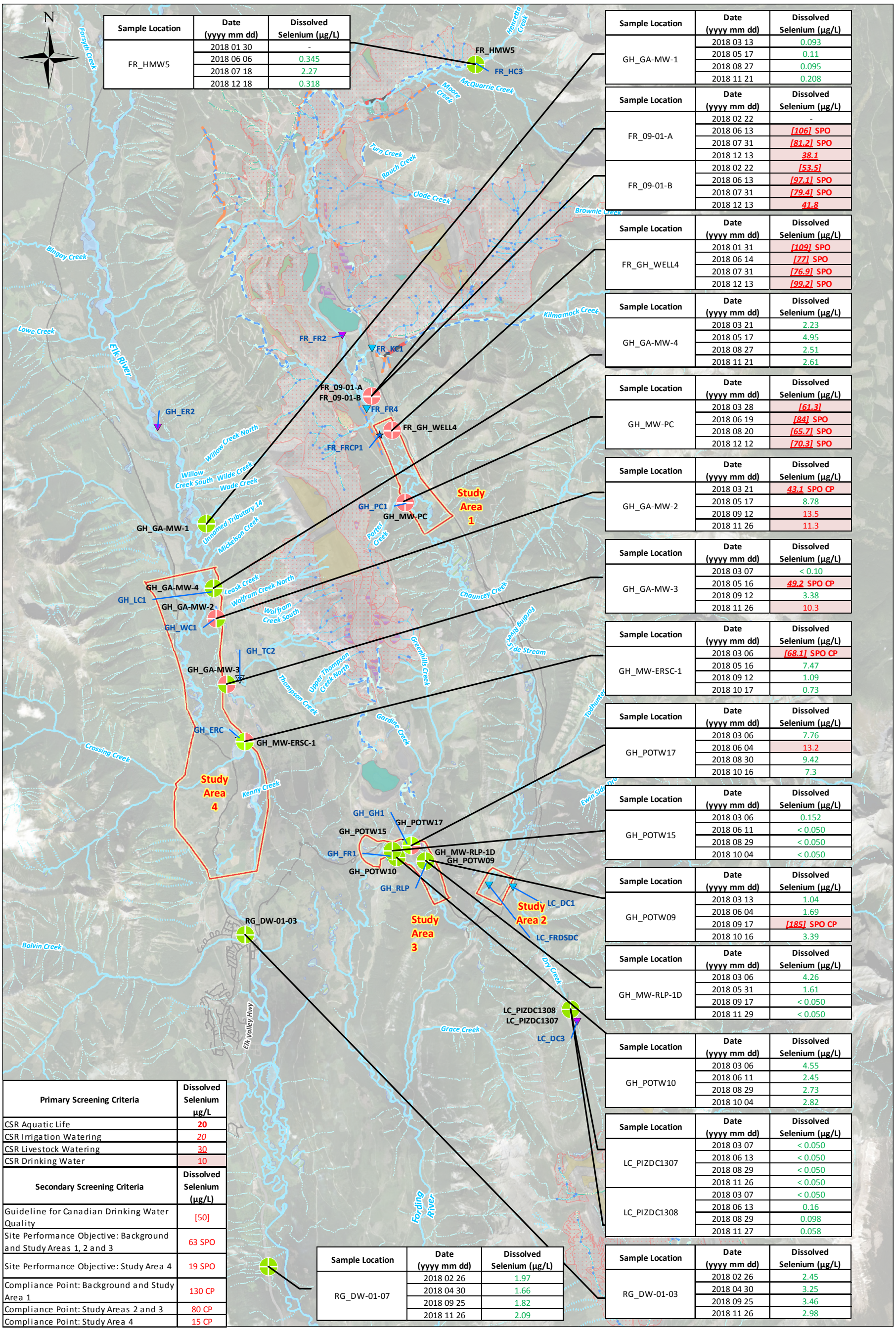


Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_HMW5	2018 01 30	-
	2018 06 06	0.345
	2018 07 18	2.27
	2018 12 18	0.318

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_GA-MW-1	2018 03 13	0.093
	2018 05 17	0.11
	2018 08 27	0.095
	2018 11 21	0.208

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_09-01-A	2018 02 22	-
	2018 06 13	[106] SPO
	2018 07 31	[81.2] SPO
	2018 12 13	38.1
FR_09-01-B	2018 02 22	[53.5]
	2018 06 13	[97.1] SPO
	2018 07 31	[79.4] SPO
	2018 12 13	41.8

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_GH_WELL4	2018 01 31	[109] SPO
	2018 06 14	[77] SPO
	2018 07 31	[76.9] SPO
	2018 12 13	[99.2] SPO

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_GA-MW-4	2018 03 21	2.23
	2018 05 17	4.95
	2018 08 27	2.51
	2018 11 21	2.61

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_MW-PC	2018 03 28	[61.3]
	2018 06 19	[84] SPO
	2018 08 20	[65.7] SPO
	2018 12 12	[70.3] SPO

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_GA-MW-2	2018 03 21	43.1 SPO CP
	2018 05 17	8.78
	2018 09 12	13.5
	2018 11 26	11.3

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_GA-MW-3	2018 03 07	< 0.10
	2018 05 16	49.2 SPO CP
	2018 09 12	3.38
	2018 11 26	10.3

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_MW-ERSC-1	2018 03 06	[68.1] SPO CP
	2018 05 16	7.47
	2018 09 12	1.09
	2018 10 17	0.73

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_POTW17	2018 03 06	7.76
	2018 06 04	13.2
	2018 08 30	9.42
	2018 10 16	7.3

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_POTW15	2018 03 06	0.152
	2018 06 11	< 0.050
	2018 08 29	< 0.050
	2018 10 04	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_POTW09	2018 03 13	1.04
	2018 06 04	1.69
	2018 09 17	[185] SPO CP
	2018 10 16	3.39

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_MW-RLP-1D	2018 03 06	4.26
	2018 05 31	1.61
	2018 09 17	< 0.050
	2018 11 29	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_POTW10	2018 03 06	4.55
	2018 06 11	2.45
	2018 08 29	2.73
	2018 10 04	2.82

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
LC_PIZDC1307	2018 03 07	< 0.050
	2018 06 13	< 0.050
	2018 08 29	< 0.050
	2018 11 26	< 0.050
LC_PIZDC1308	2018 03 07	< 0.050
	2018 06 13	0.16
	2018 08 29	0.098
	2018 11 27	0.058

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
RG_DW-01-07	2018 02 26	1.97
	2018 04 30	1.66
	2018 09 25	1.82
	2018 11 26	2.09

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
RG_DW-01-03	2018 02 26	2.45
	2018 04 30	3.25
	2018 09 25	3.46
	2018 11 26	2.98

Primary Screening Criteria	Dissolved Selenium µg/L
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10
Secondary Screening Criteria	**Dissolved Selenium (µg/L)**
Guideline for Canadian Drinking Water Quality	[50]
Site Performance Objective: Background and Study Areas 1, 2 and 3	63 SPO
Site Performance Objective: Study Area 4	19 SPO
Compliance Point: Background and Study Area 1	130 CP
Compliance Point: Study Areas 2 and 3	80 CP
Compliance Point: Study Area 4	15 CP

Well Location

Surface Water Stations
- Compliance Point
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Highway
- Secondary Road
- River Bed

Site Features
- Tailings/Settling Pond
- Reservoir
- Island
- Lake
- River Bed
- Wetland
- Study Areas
- Pit
- Stockpiles
- Waste Spoil

Q4 Q1 Q3 Q2

Green — below the applicable screening criteria
Red — above the applicable screening criteria
Grey — no data available

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.5 1 2 3 4 5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

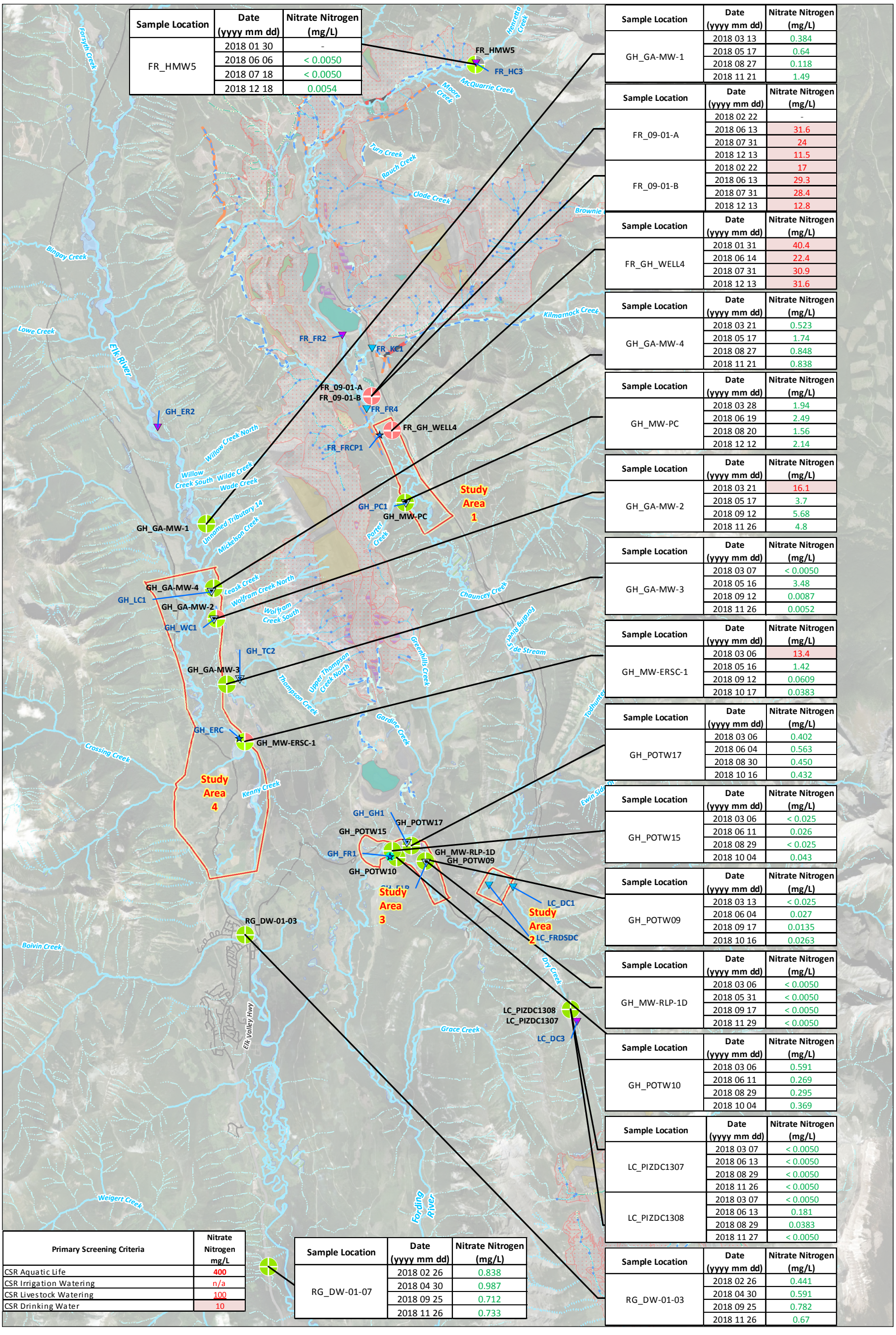
SNC·LAVALIN

Spatial Distribution of Dissolved Selenium in Groundwater- Study Areas 1 to 4

CHK'D: STH | DATE: 2019/05/16 SCALE: 1:100,000 | Ref Num: | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-327

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-327_AnalyticalData1_4_SEL_.mxd



Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_HMW5	2018 01 30	-
	2018 06 06	< 0.0050
	2018 07 18	< 0.0050
	2018 12 18	0.0054

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_GA-MW-1	2018 03 13	0.384
	2018 05 17	0.64
	2018 08 27	0.118
	2018 11 21	1.49

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_09-01-A	2018 02 22	-
	2018 06 13	31.6
	2018 07 31	24
	2018 12 13	11.5
FR_09-01-B	2018 02 22	17
	2018 06 13	29.3
	2018 07 31	28.4
	2018 12 13	12.8

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_GH_WELL4	2018 01 31	40.4
	2018 06 14	22.4
	2018 07 31	30.9
	2018 12 13	31.6

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_GA-MW-4	2018 03 21	0.523
	2018 05 17	1.74
	2018 08 27	0.848
	2018 11 21	0.838

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_MW-PC	2018 03 28	1.94
	2018 06 19	2.49
	2018 08 20	1.56
	2018 12 12	2.14

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_GA-MW-2	2018 03 21	16.1
	2018 05 17	3.7
	2018 09 12	5.68
	2018 11 26	4.8

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_GA-MW-3	2018 03 07	< 0.0050
	2018 05 16	3.48
	2018 09 12	0.0087
	2018 11 26	0.0052

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_MW-ERSC-1	2018 03 06	13.4
	2018 05 16	1.42
	2018 09 12	0.0609
	2018 10 17	0.0383

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_POTW17	2018 03 06	0.402
	2018 06 04	0.563
	2018 08 30	0.450
	2018 10 16	0.432

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_POTW15	2018 03 06	< 0.025
	2018 06 11	0.026
	2018 08 29	< 0.025
	2018 10 04	0.043

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_POTW09	2018 03 13	< 0.025
	2018 06 04	0.027
	2018 09 17	0.0135
	2018 10 16	0.0263

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_MW-RLP-1D	2018 03 06	< 0.0050
	2018 05 31	< 0.0050
	2018 09 17	< 0.0050
	2018 11 29	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_POTW10	2018 03 06	0.591
	2018 06 11	0.269
	2018 08 29	0.295
	2018 10 04	0.369

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
LC_PIZDC1307	2018 03 07	< 0.0050
	2018 06 13	< 0.0050
	2018 08 29	< 0.0050
	2018 11 26	< 0.0050
LC_PIZDC1308	2018 03 07	< 0.0050
	2018 06 13	0.181
	2018 08 29	0.0383
	2018 11 27	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
RG_DW-01-03	2018 02 26	0.441
	2018 04 30	0.591
	2018 09 25	0.782
	2018 11 26	0.67

Primary Screening Criteria	Nitrate Nitrogen mg/L
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
RG_DW-01-07	2018 02 26	0.838
	2018 04 30	0.987
	2018 09 25	0.712
	2018 11 26	0.733

Well Location

Surface Water Stations
- Compliance Point
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Highway
- Secondary Road
- River Bed

Site Features
- Tailings/Settling Pond
- Reservoir
- Island
- Lake
- River Bed
- Wetland
- Study Areas
- Pit
- Stockpiles
- Waste Spoil

Q4 | Q1 / Q3 | Q2

Green — below the applicable screening criteria
Red — above the applicable screening criteria
Grey — no data available

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.5 1 2 3 4 5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Nitrate Nitrogen in Groundwater - Study Areas 1 to 4

CHK'D: STH | DATE: 2019/05/16 SCALE: 1:100,000 | Ref Num: REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-328

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-328_AnalyticalData1_4_NN_mxd

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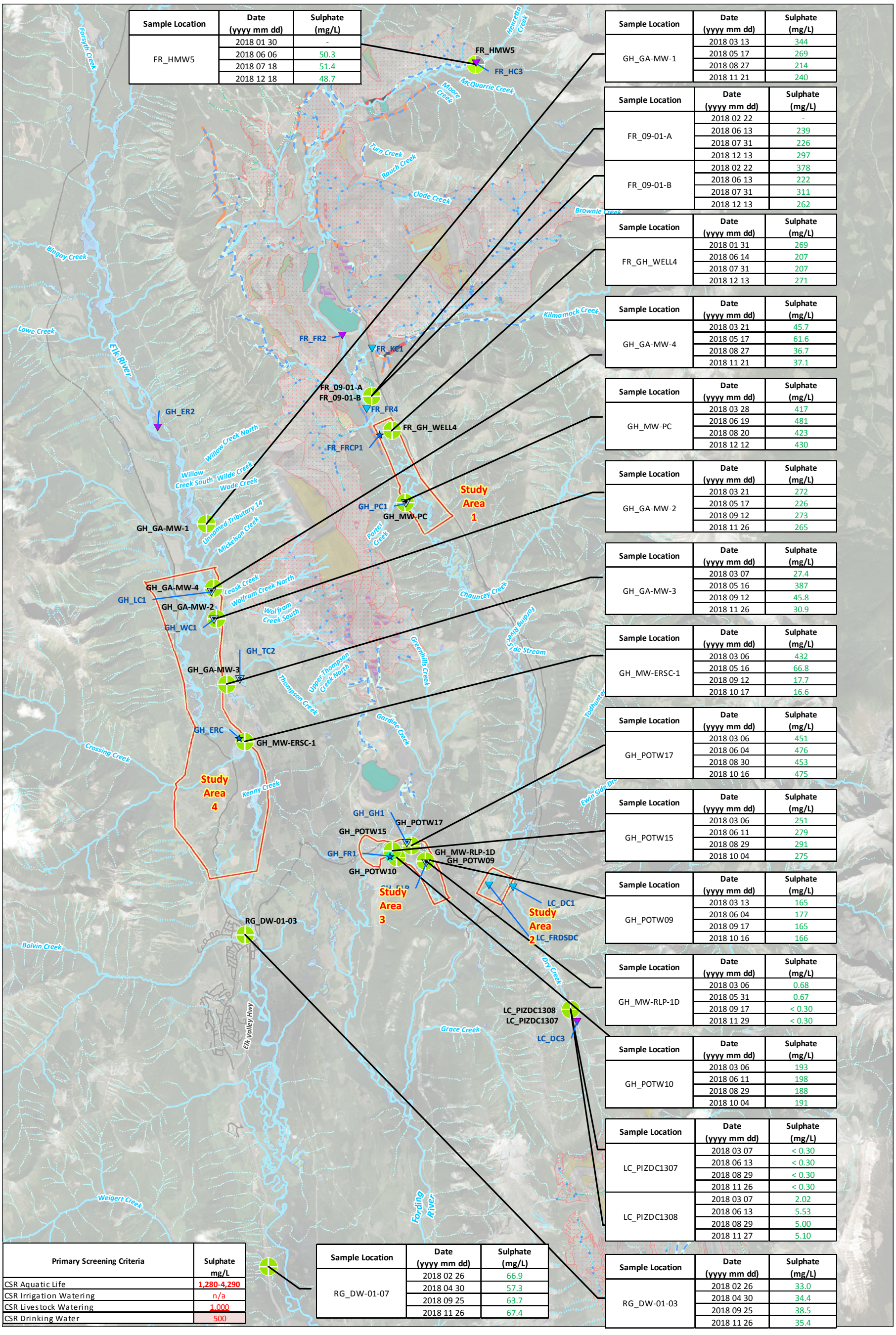

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_HMW5	2018 01 30	-
	2018 06 06	50.3
	2018 07 18	51.4
	2018 12 18	48.7

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_GA-MW-1	2018 03 13	344
	2018 05 17	269
	2018 08 27	214
	2018 11 21	240

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_09-01-A	2018 02 22	-
	2018 06 13	239
	2018 07 31	226
	2018 12 13	297
FR_09-01-B	2018 02 22	378
	2018 06 13	222
	2018 07 31	311
	2018 12 13	262

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_GH_WELL4	2018 01 31	269
	2018 06 14	207
	2018 07 31	207
	2018 12 13	271

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_GA-MW-4	2018 03 21	45.7
	2018 05 17	61.6
	2018 08 27	36.7
	2018 11 21	37.1

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_MW-PC	2018 03 28	417
	2018 06 19	481
	2018 08 20	423
	2018 12 12	430

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_GA-MW-2	2018 03 21	272
	2018 05 17	226
	2018 09 12	273
	2018 11 26	265

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_GA-MW-3	2018 03 07	27.4
	2018 05 16	387
	2018 09 12	45.8
	2018 11 26	30.9

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_MW-ERSC-1	2018 03 06	432
	2018 05 16	66.8
	2018 09 12	17.7
	2018 10 17	16.6

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_POTW17	2018 03 06	451
	2018 06 04	476
	2018 08 30	453
	2018 10 16	475

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_POTW15	2018 03 06	251
	2018 06 11	279
	2018 08 29	291
	2018 10 04	275

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_POTW09	2018 03 13	165
	2018 06 04	177
	2018 09 17	165
	2018 10 16	166

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_MW-RLP-1D	2018 03 06	0.68
	2018 05 31	0.67
	2018 09 17	< 0.30
	2018 11 29	< 0.30

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_POTW10	2018 03 06	193
	2018 06 11	198
	2018 08 29	188
	2018 10 04	191

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
LC_PIZDC1307	2018 03 07	< 0.30
	2018 06 13	< 0.30
	2018 08 29	< 0.30
	2018 11 26	< 0.30
LC_PIZDC1308	2018 03 07	2.02
	2018 06 13	5.53
	2018 08 29	5.00
	2018 11 27	5.10

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
RG_DW-01-03	2018 02 26	33.0
	2018 04 30	34.4
	2018 09 25	38.5
	2018 11 26	35.4

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
RG_DW-01-07	2018 02 26	66.9
	2018 04 30	57.3
	2018 09 25	63.7
	2018 11 26	67.4

Primary Screening Criteria	Sulphate mg/L
CSR Aquatic Life	1,280-4,290
CSR Irrigation Watering	n/a
CSR Livestock Watering	1,000
CSR Drinking Water	500

Well Location

Surface Water Stations
- Compliance Point
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Highway
- Secondary Road
- River Bed

Site Features
- Tailings/Settling Pond
- Reservoir
- Island
- Lake
- River Bed
- Wetland
- Study Areas
- Pit
- Stockpiles
- Waste Spoil

Q4 | Q1 | Q3 | Q2

Green — below the applicable screening criteria
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Grey — no data available

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References:
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Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.5 1 2 3 4 5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

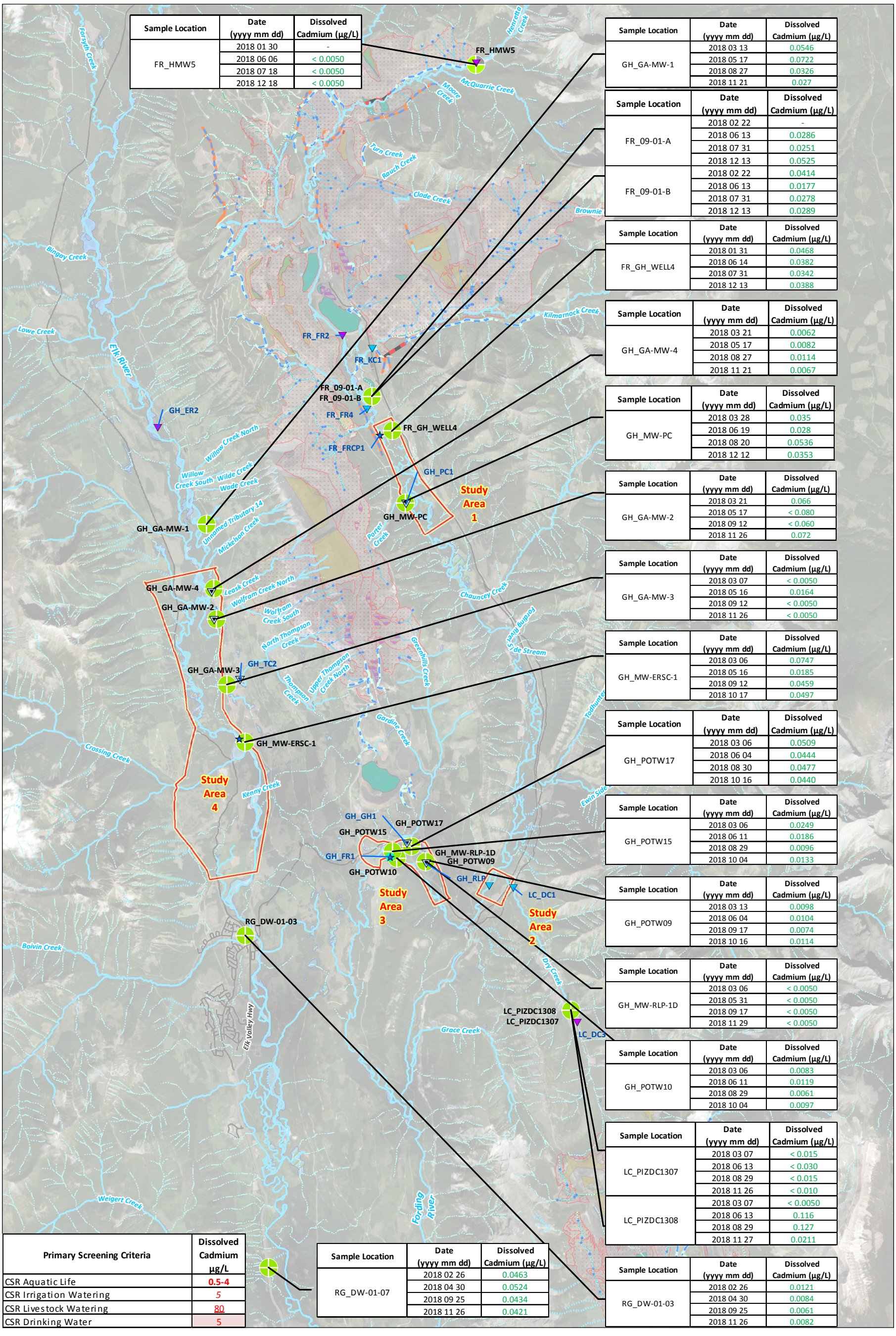
SNC·LAVALIN

Spatial Distribution of Sulphate in Groundwater - Study Areas 1 to 4

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1:100,000 | Ref Num: | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-329

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-329_AnalyticalData1_4_Sul_.mxd



Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
FR_HMW5	2018 01 30	-
	2018 06 06	< 0.0050
	2018 07 18	< 0.0050
	2018 12 18	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
GH_GA-MW-1	2018 03 13	0.0546
	2018 05 17	0.0722
	2018 08 27	0.0326
	2018 11 21	0.027

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
FR_09-01-A	2018 02 22	-
	2018 06 13	0.0286
	2018 07 31	0.0251
	2018 12 13	0.0525
FR_09-01-B	2018 02 22	0.0414
	2018 06 13	0.0177
	2018 07 31	0.0278
	2018 12 13	0.0289

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
FR_GH_WELL4	2018 01 31	0.0468
	2018 06 14	0.0382
	2018 07 31	0.0342
	2018 12 13	0.0388

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
GH_GA-MW-4	2018 03 21	0.0062
	2018 05 17	0.0082
	2018 08 27	0.0114
	2018 11 21	0.0067

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
GH_MW-PC	2018 03 28	0.035
	2018 06 19	0.028
	2018 08 20	0.0536
	2018 12 12	0.0353

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
GH_GA-MW-2	2018 03 21	0.066
	2018 05 17	< 0.080
	2018 09 12	< 0.060
	2018 11 26	0.072

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
GH_GA-MW-3	2018 03 07	< 0.0050
	2018 05 16	0.0164
	2018 09 12	< 0.0050
	2018 11 26	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
GH_MW-ERSC-1	2018 03 06	0.0747
	2018 05 16	0.0185
	2018 09 12	0.0459
	2018 10 17	0.0497

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
GH_POTW17	2018 03 06	0.0509
	2018 06 04	0.0444
	2018 08 30	0.0477
	2018 10 16	0.0440

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
GH_POTW15	2018 03 06	0.0249
	2018 06 11	0.0186
	2018 08 29	0.0096
	2018 10 04	0.0133

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
GH_POTW09	2018 03 13	0.0098
	2018 06 04	0.0104
	2018 09 17	0.0074
	2018 10 16	0.0114

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
GH_MW-RLP-1D	2018 03 06	< 0.0050
	2018 05 31	< 0.0050
	2018 09 17	< 0.0050
	2018 11 29	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
GH_POTW10	2018 03 06	0.0083
	2018 06 11	0.0119
	2018 08 29	0.0061
	2018 10 04	0.0097

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
LC_PIZDC1307	2018 03 07	< 0.015
	2018 06 13	< 0.030
	2018 08 29	< 0.015
	2018 11 26	< 0.010
LC_PIZDC1308	2018 03 07	< 0.0050
	2018 06 13	0.116
	2018 08 29	0.127
	2018 11 27	0.0211

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
RG_DW-01-03	2018 02 26	0.0121
	2018 04 30	0.0084
	2018 09 25	0.0061
	2018 11 26	0.0082

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
RG_DW-01-07	2018 02 26	0.0463
	2018 04 30	0.0524
	2018 09 25	0.0434
	2018 11 26	0.0421

Primary Screening Criteria	Dissolved Cadmium µg/L
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

Well Location

Surface Water Stations
- Compliance Point
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Highway
- Secondary Road
- River Bed

Site Features
- Tailings/Settling Pond
- Reservoir
- Island
- Lake
- River Bed
- Wetland
- Study Areas
- Pit
- Stockpiles
- Waste Spoil

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria
Grey no data available

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
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2. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.5 1 2 3 4 5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Cadmium in Groundwater - Study Areas 1 to 4

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1:100,000 | Ref Num: | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-330

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-330_AnalyticalData1_4_Cad_.mxd

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
LC_PIZP1101	2018 03 20	< 0.050
	2018 06 19	< 0.050
	2018 09 13	< 0.050
	2018 11 16	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
RG_DW-02-20	2018 02 13	12.3
	2018 04 25	12.8
	2018 09 26	9.87
	2018 11 26	9.83

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_GV3gw	2018 02 20	3.92
	2018 05 29	4.09
	2018 08 21	4.36
	2018 10 18	4.34

Primary Screening Criteria	Dissolved Selenium µg/L
CSR Aquatic Life	20
CSR Irrigation Watering	*20*
CSR Livestock Watering	30
CSR Drinking Water	10
Secondary Screening Criteria	**Dissolved Selenium (µg/L)**
Guideline for Canadian Drinking Water Quality	[50]
Site Performance Objective: Study Area 6	23 SPO
Site Performance Objective: Study Area 7	19 SPO
Compliance Point	n/a

Well Location

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Rock Drain
- Highway
- Secondary Road
- EVO Permitted Boundary

Site Features
- Tailings/Settling Pond
- Island
- Lake
- River Bed
- Wetland
- Pit
- Stockpiles
- Waste Spoil
- Study Areas

Q4 Q1 Q3 Q2

Green — below the applicable screening criteria
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Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Dissolved Selenium in Groundwater- Study Areas 5 to 7

CHK'D: STH | DATE: 2019/05/15 SCALE: 1:50,000 | Ref Num: REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-331

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-331_AnalyticalData5_7_SEL.mxd

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
LC_PIZP1101	2018 03 20	< 0.0050
	2018 06 19	0.0083
	2018 09 13	-
	2018 11 16	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
RG_DW-02-20	2018 02 13	2.73
	2018 04 25	2.97
	2018 09 26	2.08
	2018 11 26	2.37

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_GV3gw	2018 02 20	0.118
	2018 05 29	0.133
	2018 08 21	0.133
	2018 10 18	0.120

Primary Screening Criteria	Nitrate Nitrogen mg/L
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

Well Location

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring
- Study Areas

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Rock Drain
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil
- EVO Permitted Boundary

Site Features
- Tailings/Settling Pond
- Island
- Lake
- River Bed
- Wetland

Q4 Q1 Q3 Q2

Green – below the applicable screening criteria
Red – above the applicable screening criteria
Grey – no data available

Notes:
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Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

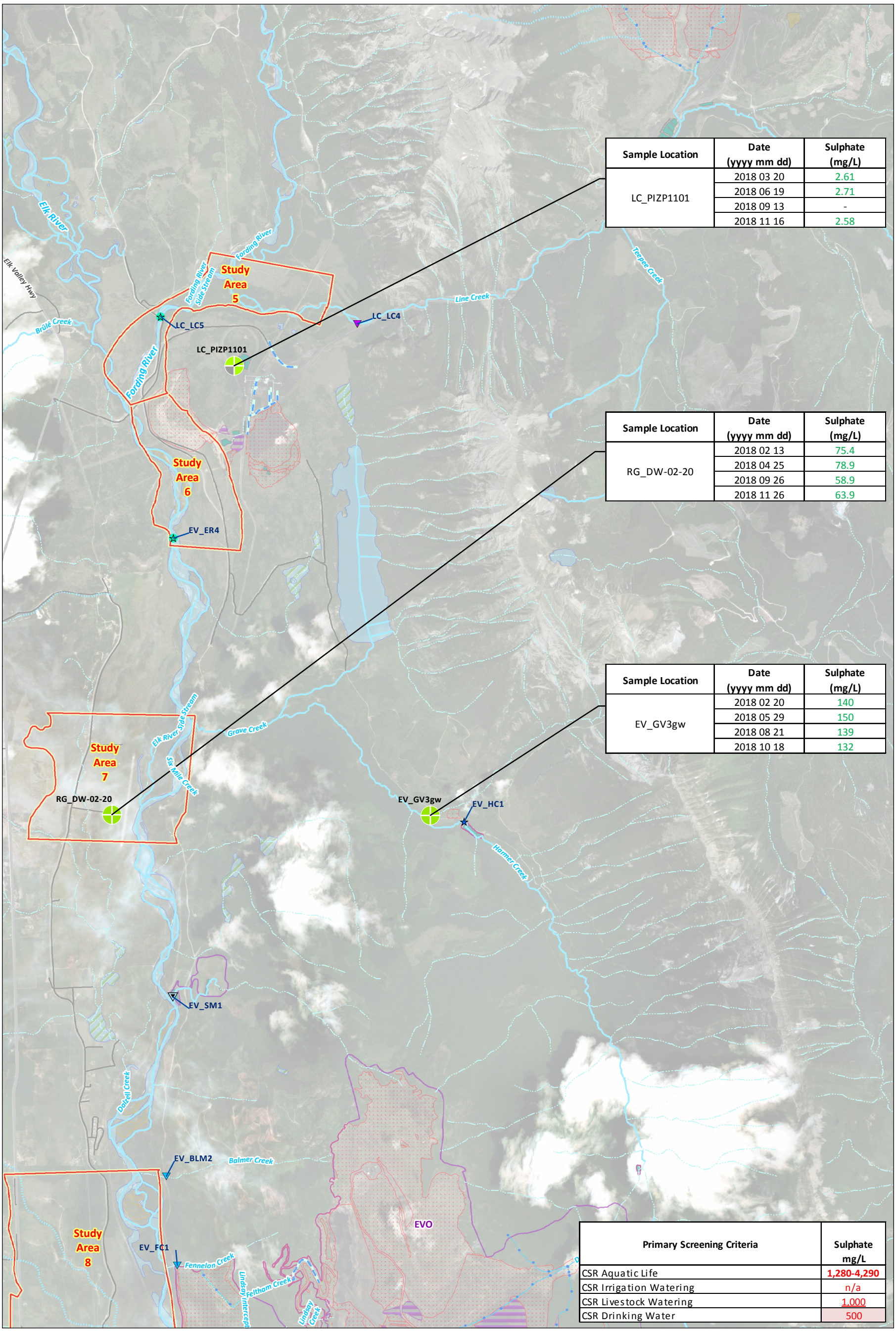
SNC·LAVALIN

Spatial Distribution of Nitrate Nitrogen in Groundwater – Study Areas 5 to 7

CHK'D: STH | DATE: 2019/05/15 SCALE: 1:50,000 | Ref Num: REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-332

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-332_AnalyticalData5_7_NN.mxd



Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
LC_PIZP1101	2018 03 20	2.61
	2018 06 19	2.71
	2018 09 13	-
	2018 11 16	2.58

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
RG_DW-02-20	2018 02 13	75.4
	2018 04 25	78.9
	2018 09 26	58.9
	2018 11 26	63.9

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_GV3gw	2018 02 20	140
	2018 05 29	150
	2018 08 21	139
	2018 10 18	132

Primary Screening Criteria	Sulphate mg/L
CSR Aquatic Life	1,280-4,290
CSR Irrigation Watering	n/a
CSR Livestock Watering	1,000
CSR Drinking Water	500

Legend

Well Location

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Rock Drain
- Highway
- Secondary Road
- EVO Permitted Boundary

Site Features
- Tailings/Settling Pond
- Island
- Lake
- River Bed
- Wetland
- Study Areas
- Pit
- Stockpiles
- Waste Spoil

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria
Grey no data available

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Sulphate in Groundwater – Study Areas 5 to 7

CHK'D: STH	DATE: 2019/05/16 SCALE: 1:50,000	Ref Num:	REV: 1
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N	661460-333	

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-333_AnalyticalData5_7_Sul.mxd

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
LC_PIZP1101	2018 03 20	< 0.0050
	2018 06 19	< 0.0050
	2018 09 13	0.0155
	2018 11 16	0.0113

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
RG_DW-02-20	2018 02 13	0.0060
	2018 04 25	0.0069
	2018 09 26	0.0075
	2018 11 26	0.0094

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_GV3gw	2018 02 20	0.0084
	2018 05 29	0.0081
	2018 08 21	0.0088
	2018 10 18	0.0081

Primary Screening Criteria	Dissolved Cadmium µg/L
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

Well Location

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
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- Highway
- Secondary Road
- EVO Permitted Boundary

Site Features
- Tailings/Settling Pond
- Island
- Lake
- River Bed
- Wetland
- Study Areas
- Pit
- Stockpiles
- Waste Spoil

Q4 | Q1
Q3 | Q2

Green — below the applicable screening criteria
Red — above the applicable screening criteria
Grey — no data available

Notes:
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2. Original in colour.
3. Site location is approximate.

References:
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2. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

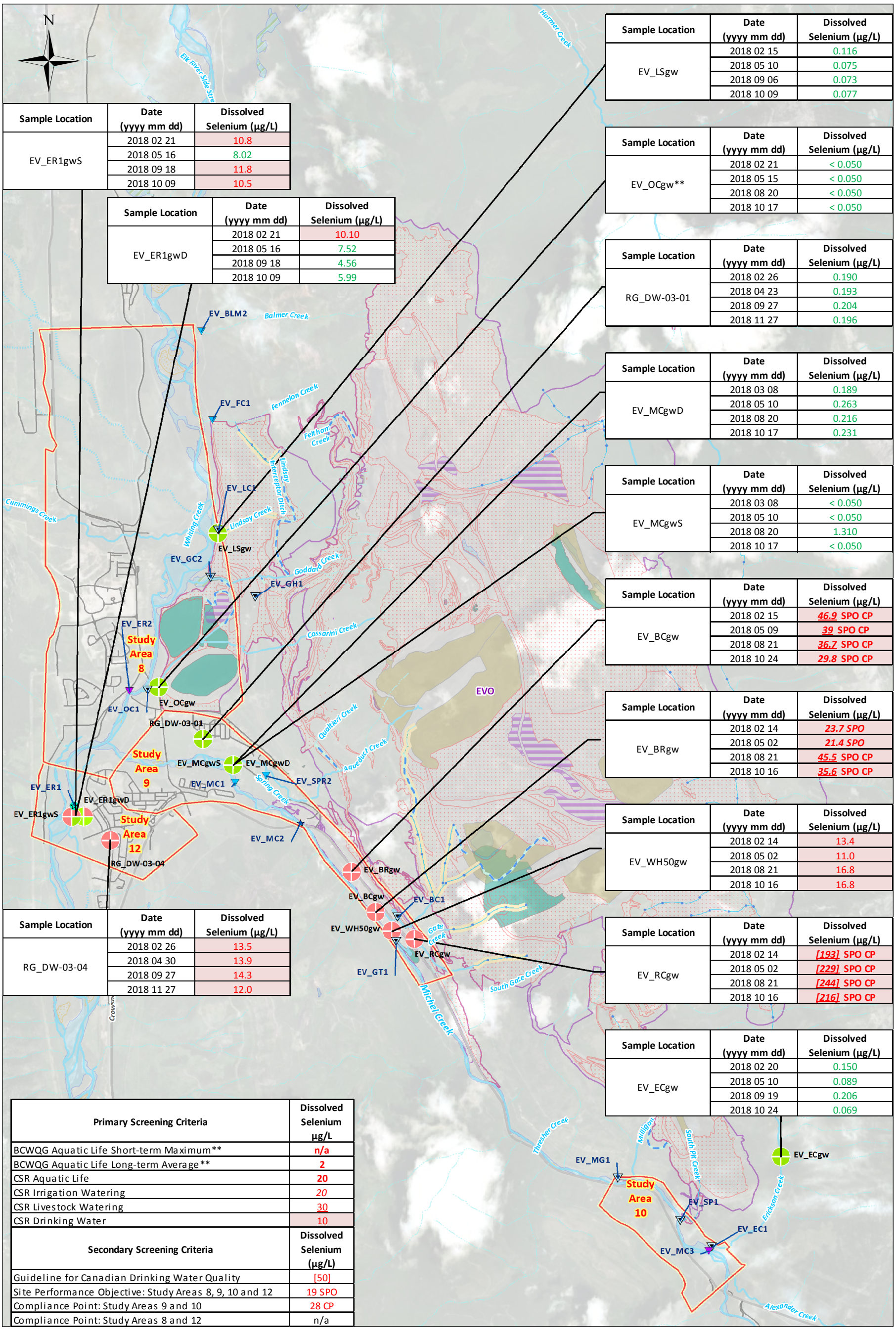
SNC·LAVALIN

Spatial Distribution of Cadmium in Groundwater – Study Areas 5 to 7

CHK'D: STH | DATE: 2019/05/15 SCALE: 1:50,000 | Ref Num: REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-334

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-334_AnalyticalData5_7_Cad.mxd



Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_ER1gwS	2018 02 21	10.8
	2018 05 16	8.02
	2018 09 18	11.8
	2018 10 09	10.5

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_ER1gwD	2018 02 21	10.10
	2018 05 16	7.52
	2018 09 18	4.56
	2018 10 09	5.99

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
RG_DW-03-04	2018 02 26	13.5
	2018 04 30	13.9
	2018 09 27	14.3
	2018 11 27	12.0

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_LSgw	2018 02 15	0.116
	2018 05 10	0.075
	2018 09 06	0.073
	2018 10 09	0.077

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_OCgw**	2018 02 21	< 0.050
	2018 05 15	< 0.050
	2018 08 20	< 0.050
	2018 10 17	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
RG_DW-03-01	2018 02 26	0.190
	2018 04 23	0.193
	2018 09 27	0.204
	2018 11 27	0.196

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_MCgwD	2018 03 08	0.189
	2018 05 10	0.263
	2018 08 20	0.216
	2018 10 17	0.231

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_MCgwS	2018 03 08	< 0.050
	2018 05 10	< 0.050
	2018 08 20	1.310
	2018 10 17	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_BCgw	2018 02 15	46.9 SPO CP
	2018 05 09	39 SPO CP
	2018 08 21	36.7 SPO CP
	2018 10 24	29.8 SPO CP

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_BRgw	2018 02 14	23.7 SPO
	2018 05 02	21.4 SPO
	2018 08 21	45.5 SPO CP
	2018 10 16	35.6 SPO CP

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_WH50gw	2018 02 14	13.4
	2018 05 02	11.0
	2018 08 21	16.8
	2018 10 16	16.8

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_RCgw	2018 02 14	[193] SPO CP
	2018 05 02	[229] SPO CP
	2018 08 21	[244] SPO CP
	2018 10 16	[216] SPO CP

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_ECgw	2018 02 20	0.150
	2018 05 10	0.089
	2018 09 19	0.206
	2018 10 24	0.069

Primary Screening Criteria	Dissolved Selenium µg/L
BCWQG Aquatic Life Short-term Maximum**	n/a
BCWQG Aquatic Life Long-term Average**	2
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10
Secondary Screening Criteria	**Dissolved Selenium (µg/L)**
Guideline for Canadian Drinking Water Quality	[50]
Site Performance Objective: Study Areas 8, 9, 10 and 12	19 SPO
Compliance Point: Study Areas 9 and 10	28 CP
Compliance Point: Study Areas 8 and 12	n/a

LEGEND

Well Location

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
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- Reservoir
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- Stockpiles
- Waste Spoil

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
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3. Site location is approximate.
** applicable at EV_Ocgw

References:
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2. © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-15 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Dissolved Selenium in Groundwater- Study Areas 8 to 10 and 12

CHK'D: STH | DATE: 2019/05/16 SCALE: 1:50,000 | Ref Num: REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-335

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport

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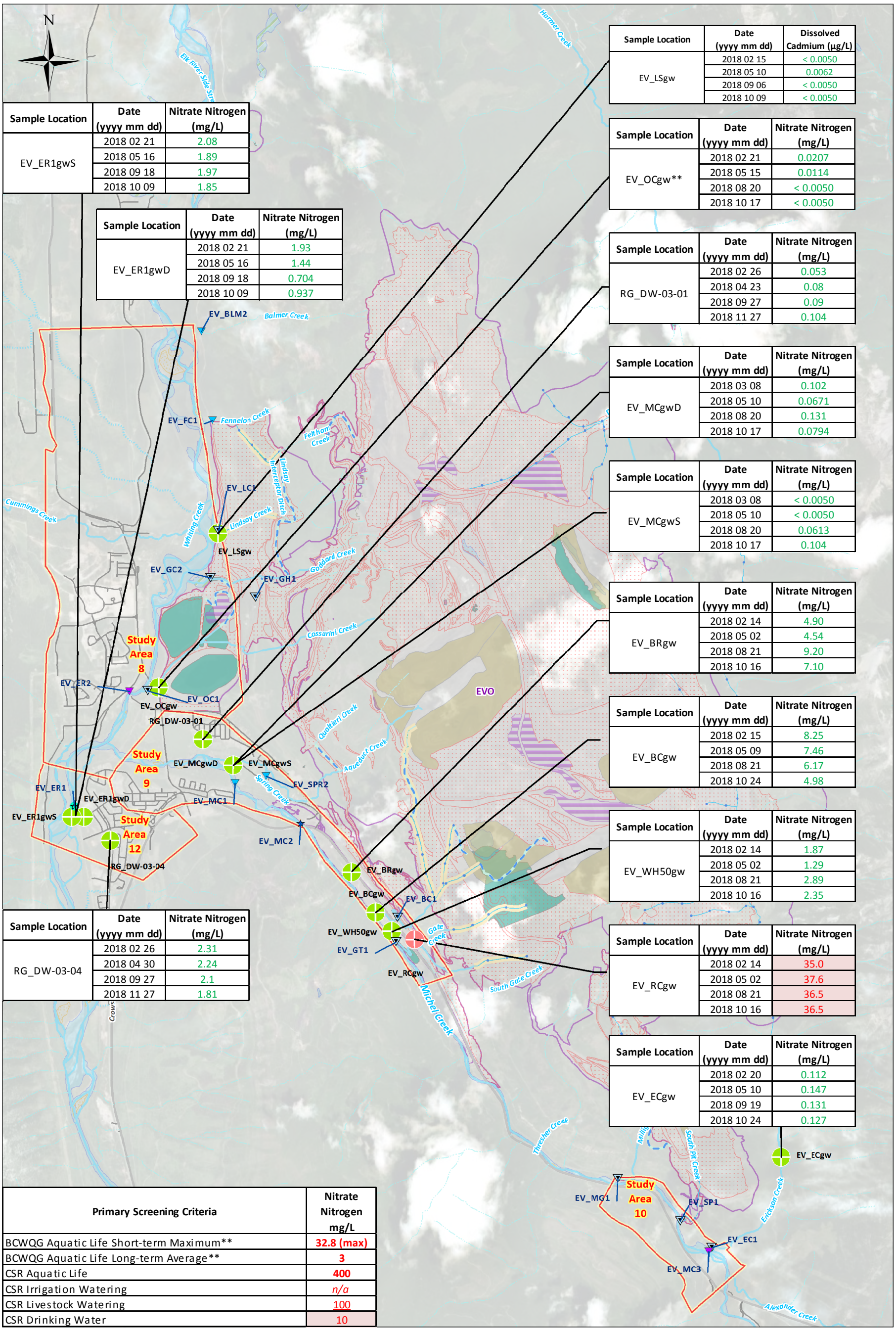

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_ER1gwS	2018 02 21	2.08
	2018 05 16	1.89
	2018 09 18	1.97
	2018 10 09	1.85

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_ER1gwD	2018 02 21	1.93
	2018 05 16	1.44
	2018 09 18	0.704
	2018 10 09	0.937

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
RG_DW-03-04	2018 02 26	2.31
	2018 04 30	2.24
	2018 09 27	2.1
	2018 11 27	1.81

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_LSgw	2018 02 15	< 0.0050
	2018 05 10	0.0062
	2018 09 06	< 0.0050
	2018 10 09	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_OCgw**	2018 02 21	0.0207
	2018 05 15	0.0114
	2018 08 20	< 0.0050
	2018 10 17	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
RG_DW-03-01	2018 02 26	0.053
	2018 04 23	0.08
	2018 09 27	0.09
	2018 11 27	0.104

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_MCgwD	2018 03 08	0.102
	2018 05 10	0.0671
	2018 08 20	0.131
	2018 10 17	0.0794

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_MCgwS	2018 03 08	< 0.0050
	2018 05 10	< 0.0050
	2018 08 20	0.0613
	2018 10 17	0.104

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_BRgw	2018 02 14	4.90
	2018 05 02	4.54
	2018 08 21	9.20
	2018 10 16	7.10

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_BCgw	2018 02 15	8.25
	2018 05 09	7.46
	2018 08 21	6.17
	2018 10 24	4.98

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_WH50gw	2018 02 14	1.87
	2018 05 02	1.29
	2018 08 21	2.89
	2018 10 16	2.35

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_RCgw	2018 02 14	35.0
	2018 05 02	37.6
	2018 08 21	36.5
	2018 10 16	36.5

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_ECgw	2018 02 20	0.112
	2018 05 10	0.147
	2018 09 19	0.131
	2018 10 24	0.127

Primary Screening Criteria	Nitrate Nitrogen mg/L
BCWQG Aquatic Life Short-term Maximum**	32.8 (max)
BCWQG Aquatic Life Long-term Average**	3
CSR Aquatic Life	400
CSR Irrigation Watering	*n/a*
CSR Livestock Watering	100
CSR Drinking Water	10

Legend

Well Location

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Rock Drain
- Island
- Lake
- River Bed
- Wetland

Site Features
- Tailings/Settling Pond
- Reservoir
- Study Areas
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil
- EVO Permitted Boundary

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
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2. Original in colour.
3. Site location is approximate.
** applicable at EV_Ocgw

References:
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2. © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-15 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

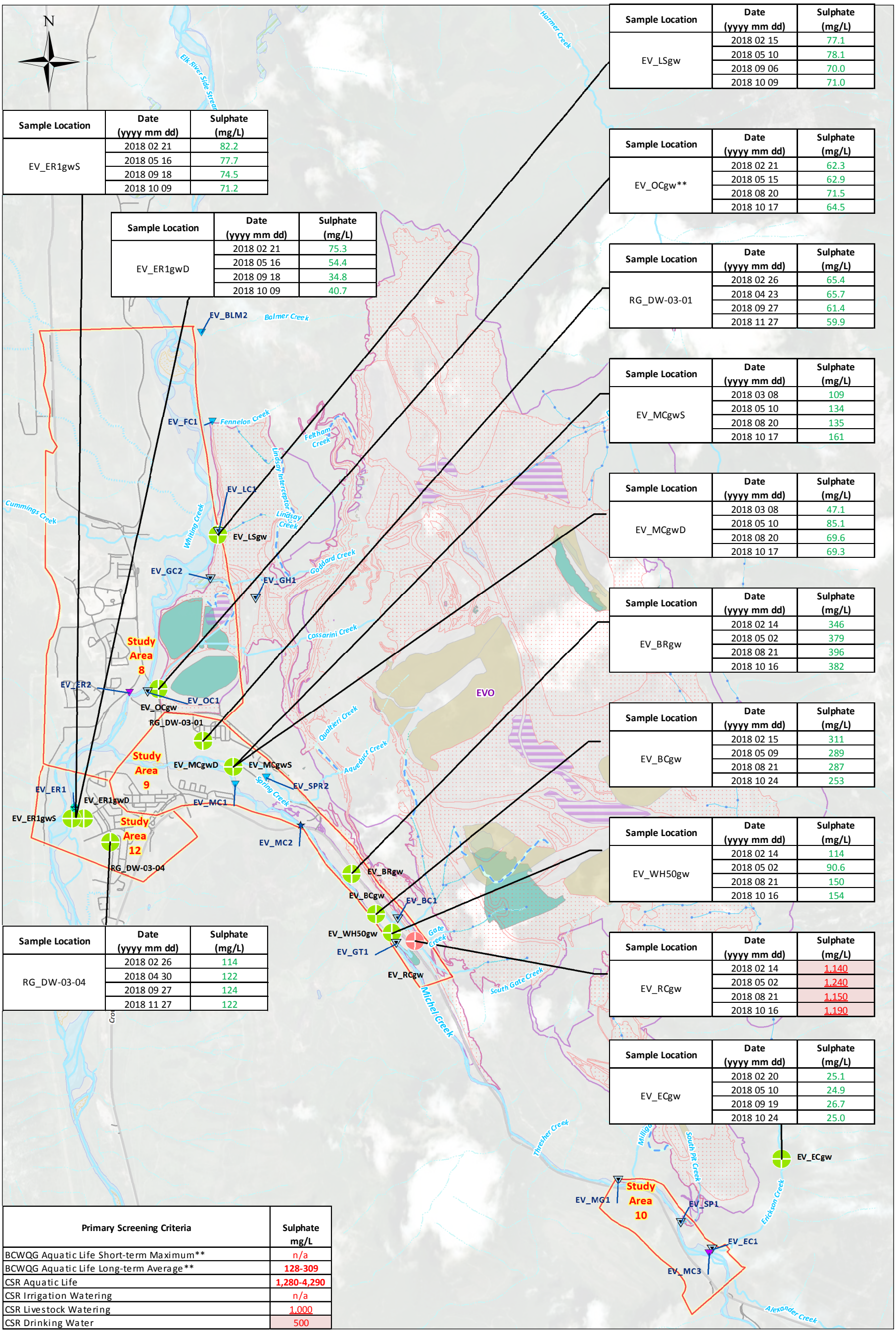
SNC·LAVALIN

Spatial Distribution of Nitrate Nitrogen in Groundwater – Study Areas 8 to 10 and 12

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1:50,000 | Ref Num: | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-336

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-336_AnalyticalData_891012_NN.mxd



Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_LSgw	2018 02 15	77.1
	2018 05 10	78.1
	2018 09 06	70.0
	2018 10 09	71.0

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_ER1gwS	2018 02 21	82.2
	2018 05 16	77.7
	2018 09 18	74.5
	2018 10 09	71.2

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_OCgw**	2018 02 21	62.3
	2018 05 15	62.9
	2018 08 20	71.5
	2018 10 17	64.5

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_ER1gwD	2018 02 21	75.3
	2018 05 16	54.4
	2018 09 18	34.8
	2018 10 09	40.7

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
RG_DW-03-01	2018 02 26	65.4
	2018 04 23	65.7
	2018 09 27	61.4
	2018 11 27	59.9

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_MCgwS	2018 03 08	109
	2018 05 10	134
	2018 08 20	135
	2018 10 17	161

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_MCgwD	2018 03 08	47.1
	2018 05 10	85.1
	2018 08 20	69.6
	2018 10 17	69.3

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_BRgw	2018 02 14	346
	2018 05 02	379
	2018 08 21	396
	2018 10 16	382

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_BCgw	2018 02 15	311
	2018 05 09	289
	2018 08 21	287
	2018 10 24	253

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_WH50gw	2018 02 14	114
	2018 05 02	90.6
	2018 08 21	150
	2018 10 16	154

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_RCgw	2018 02 14	1,140
	2018 05 02	1,240
	2018 08 21	1,150
	2018 10 16	1,190

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_ECgw	2018 02 20	25.1
	2018 05 10	24.9
	2018 09 19	26.7
	2018 10 24	25.0

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
RG_DW-03-04	2018 02 26	114
	2018 04 30	122
	2018 09 27	124
	2018 11 27	122

Primary Screening Criteria	Sulphate mg/L
BCWQG Aquatic Life Short-term Maximum**	n/a
BCWQG Aquatic Life Long-term Average**	128-309
CSR Aquatic Life	1,280-4,290
CSR Irrigation Watering	n/a
CSR Livestock Watering	1,000
CSR Drinking Water	500

Legend

Well Location

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
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- Monitoring

Water Features
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- Stream Ditch
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- Stockpiles
- Waste Spoil

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
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2. Original in colour.
3. Site location is approximate.
** applicable at EV_Ocgw

References:
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2. © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS

Revisons:
0 - AO - 2019-04-18 - DRAFT - STH
1 - AO - 2019-05-15 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

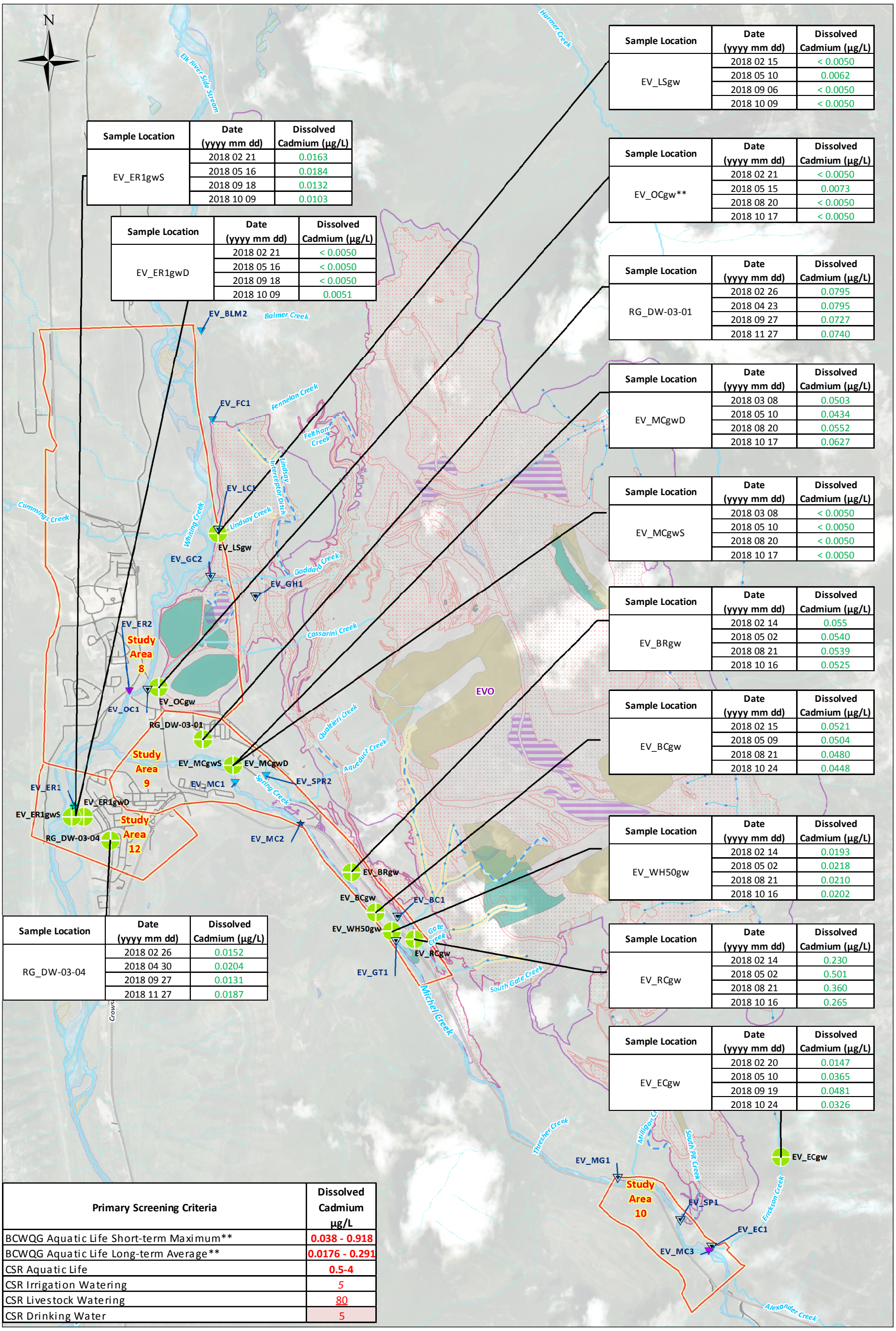
SNC·LAVALIN

Spatial Distribution of Sulphate in Groundwater – Study Areas 8 to 10 and 12

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1:50,000 | Ref Num: | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-337

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-337_AnalyticalData_891012_Sul.mxd



Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_ER1gwS	2018 02 21	0.0163
	2018 05 16	0.0184
	2018 09 18	0.0132
	2018 10 09	0.0103

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_ER1gwD	2018 02 21	< 0.0050
	2018 05 16	< 0.0050
	2018 09 18	< 0.0050
	2018 10 09	0.0051

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
RG_DW-03-04	2018 02 26	0.0152
	2018 04 30	0.0204
	2018 09 27	0.0131
	2018 11 27	0.0187

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_LSgw	2018 02 15	< 0.0050
	2018 05 10	0.0062
	2018 09 06	< 0.0050
	2018 10 09	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_OCgw**	2018 02 21	< 0.0050
	2018 05 15	0.0073
	2018 08 20	< 0.0050
	2018 10 17	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
RG_DW-03-01	2018 02 26	0.0795
	2018 04 23	0.0795
	2018 09 27	0.0727
	2018 11 27	0.0740

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_MCgwD	2018 03 08	0.0503
	2018 05 10	0.0434
	2018 08 20	0.0552
	2018 10 17	0.0627

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_MCgwS	2018 03 08	< 0.0050
	2018 05 10	< 0.0050
	2018 08 20	< 0.0050
	2018 10 17	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_BRgw	2018 02 14	0.055
	2018 05 02	0.0540
	2018 08 21	0.0539
	2018 10 16	0.0525

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_BCgw	2018 02 15	0.0521
	2018 05 09	0.0504
	2018 08 21	0.0480
	2018 10 24	0.0448

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_WH50gw	2018 02 14	0.0193
	2018 05 02	0.0218
	2018 08 21	0.0210
	2018 10 16	0.0202

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_RCgw	2018 02 14	0.230
	2018 05 02	0.501
	2018 08 21	0.360
	2018 10 16	0.265

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
EV_ECgw	2018 02 20	0.0147
	2018 05 10	0.0365
	2018 09 19	0.0481
	2018 10 24	0.0326

Primary Screening Criteria	Dissolved Cadmium µg/L
BCWQG Aquatic Life Short-term Maximum**	0.038 - 0.918
BCWQG Aquatic Life Long-term Average**	0.0176 - 0.291
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

LEGEND

Well Location

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
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- Stream Ditch
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Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

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** applicable at EV_Ocgw

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2. © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-15 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Cadmium in Groundwater – Study Areas 8 to 10 and 12

CHK'D: STH | DATE: 2019/05/16 SCALE: 1:50,000 | Ref Num: REV: 1

BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-338

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport

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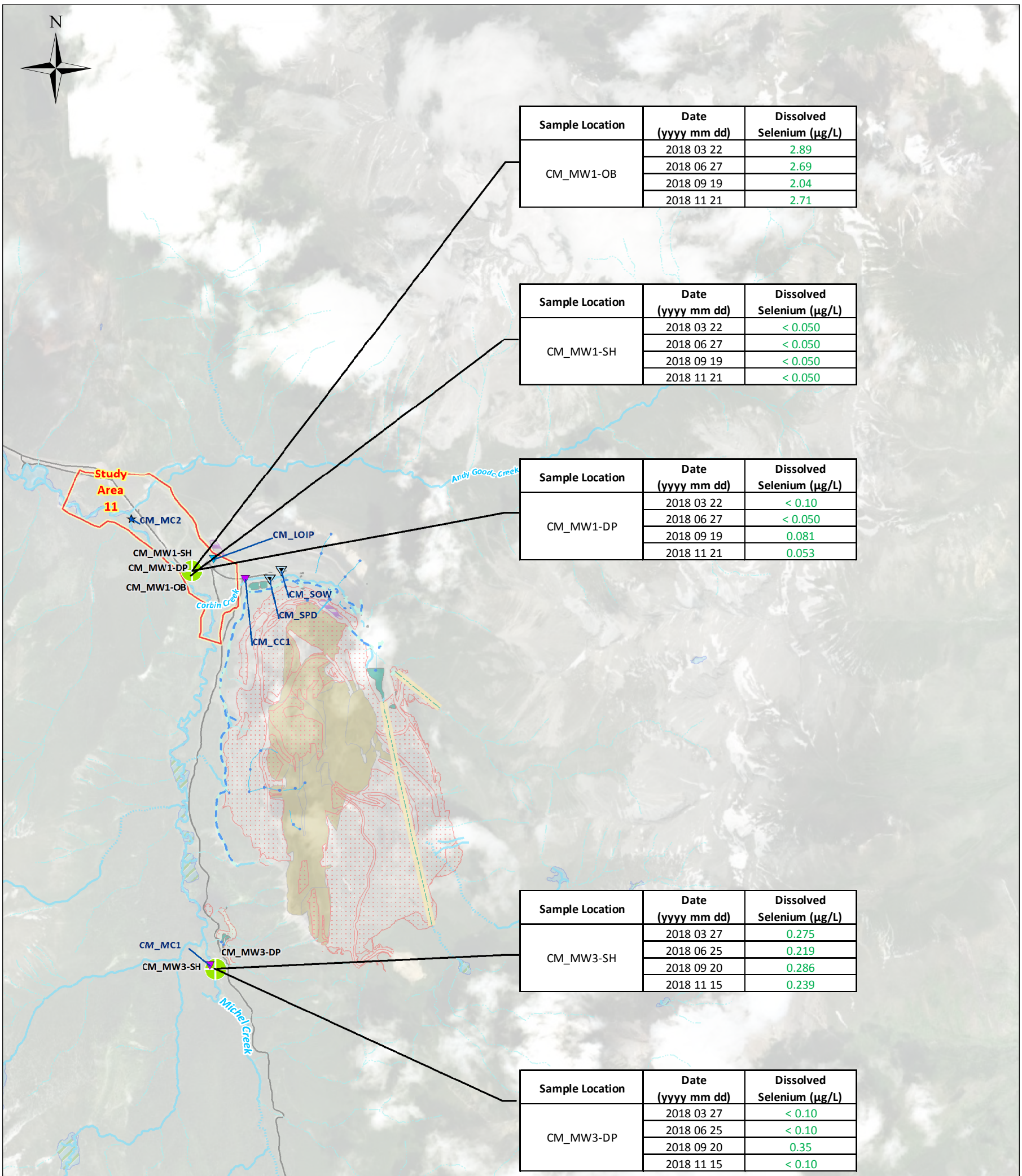

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
CM_MW1-OB	2018 03 22	2.89
	2018 06 27	2.69
	2018 09 19	2.04
	2018 11 21	2.71

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
CM_MW1-SH	2018 03 22	< 0.050
	2018 06 27	< 0.050
	2018 09 19	< 0.050
	2018 11 21	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
CM_MW1-DP	2018 03 22	< 0.10
	2018 06 27	< 0.050
	2018 09 19	0.081
	2018 11 21	0.053

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
CM_MW3-SH	2018 03 27	0.275
	2018 06 25	0.219
	2018 09 20	0.286
	2018 11 15	0.239

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
CM_MW3-DP	2018 03 27	< 0.10
	2018 06 25	< 0.10
	2018 09 20	0.35
	2018 11 15	< 0.10

Primary Screening Criteria	Dissolved Selenium µg/L
CSR Aquatic Life	**20**
CSR Irrigation Watering	*20*
CSR Livestock Watering	30
CSR Drinking Water	10
Secondary Screening Criteria	**Dissolved Selenium (µg/L)**
Guideline for Canadian Drinking Water Quality	[50]
Site Performance Objective: Background and Study Area 11	19 SPO
Compliance Point: Background and Study Area 11	19 CP

LEGEND

Well Location

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Rock Drain
- Lake
- River Bed
- Wetland

Site Features
- Tailings/Settling Pond
- Reservoir
- Study Areas
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
** applicable at EV_Ocgw

References:
1. Data provided by Teck Coal Ltd.
2. © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Dissolved Selenium in Groundwater- Study Area 11

CHK'D: STH | DATE: 2019/05/16 SCALE: 1:50,000 | Ref Num: REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-339

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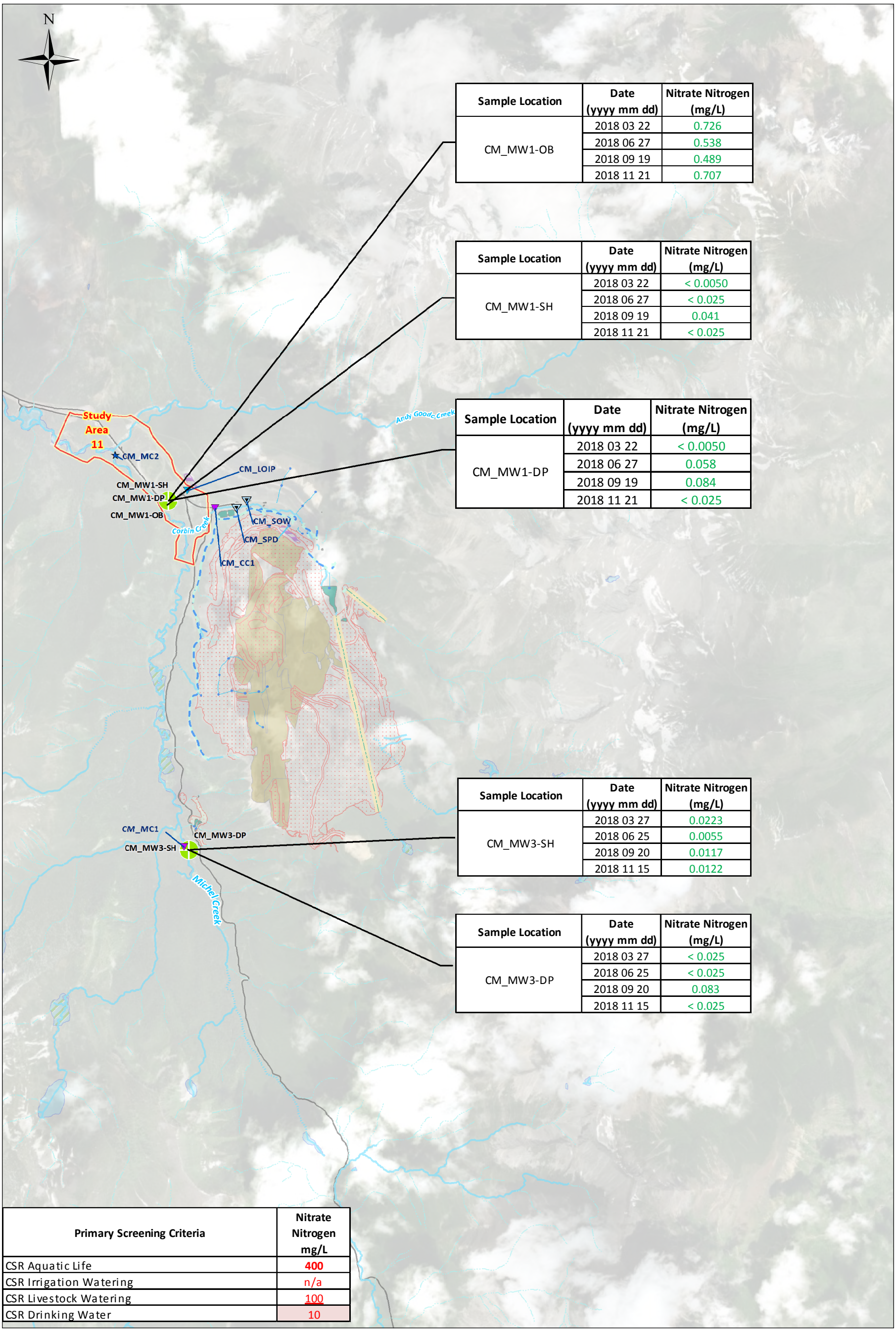
MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\661460_AnnualReport\661640-339_AnalyticalData_11_Sel_1.mxd



Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
CM_MW1-OB	2018 03 22	0.726
	2018 06 27	0.538
	2018 09 19	0.489
	2018 11 21	0.707

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
CM_MW1-SH	2018 03 22	< 0.0050
	2018 06 27	< 0.025
	2018 09 19	0.041
	2018 11 21	< 0.025

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
CM_MW1-DP	2018 03 22	< 0.0050
	2018 06 27	0.058
	2018 09 19	0.084
	2018 11 21	< 0.025

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
CM_MW3-SH	2018 03 27	0.0223
	2018 06 25	0.0055
	2018 09 20	0.0117
	2018 11 15	0.0122

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
CM_MW3-DP	2018 03 27	< 0.025
	2018 06 25	< 0.025
	2018 09 20	0.083
	2018 11 15	< 0.025

Primary Screening Criteria	Nitrate Nitrogen mg/L
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

Legend

Well Location

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Rock Drain
- Lake
- River Bed
- Wetland

Site Features
- Tailings/Settling Pond
- Reservoir
- Study Areas
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
** applicable at EV_Ocgw

References:
1. Data provided by Teck Coal Ltd.
2. © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Dissolved Nitrate Nitrogen in Groundwater- Study Area 11

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1:50,000 | Ref Num: | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-340

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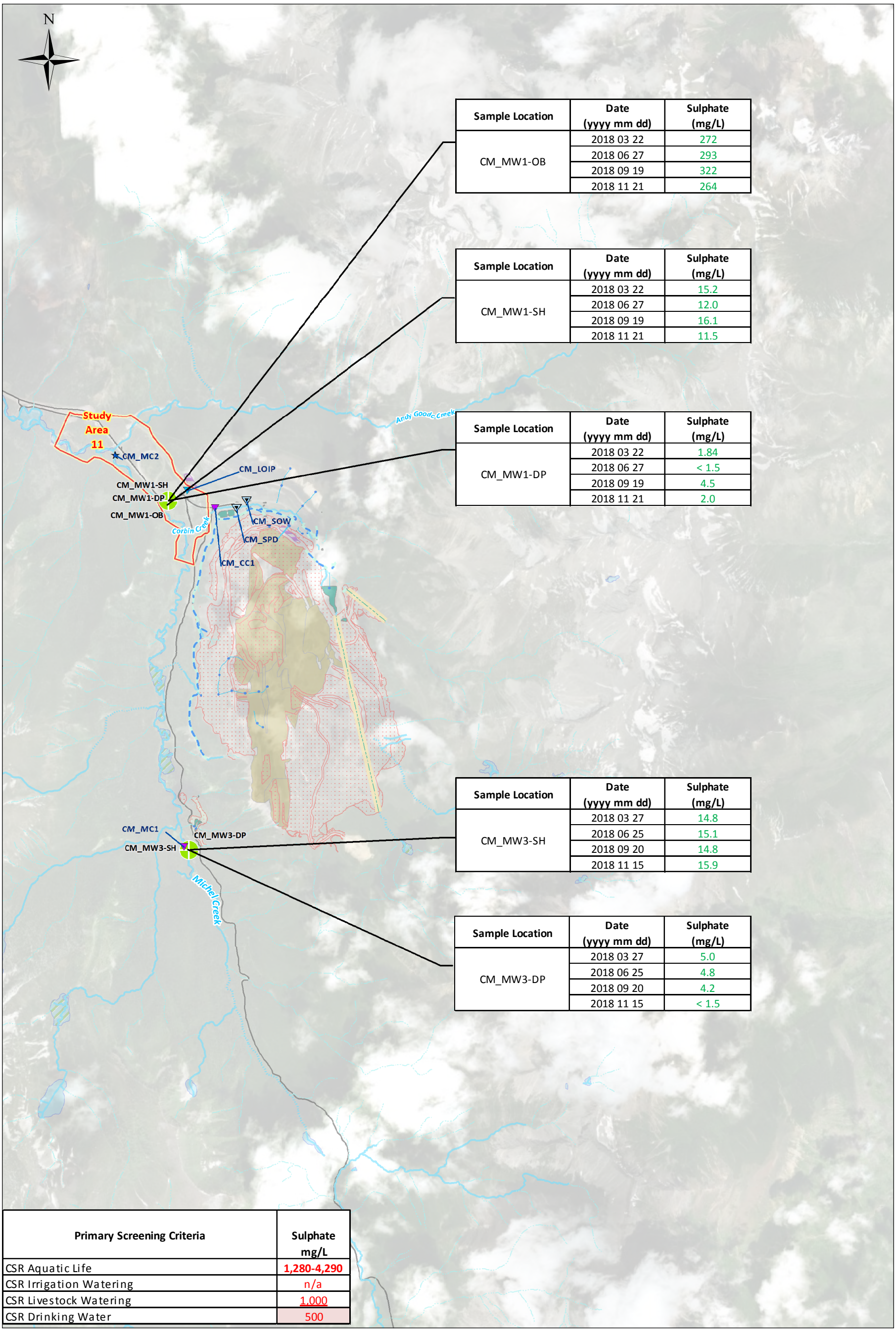

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
CM_MW1-OB	2018 03 22	272
	2018 06 27	293
	2018 09 19	322
	2018 11 21	264

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
CM_MW1-SH	2018 03 22	15.2
	2018 06 27	12.0
	2018 09 19	16.1
	2018 11 21	11.5

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
CM_MW1-DP	2018 03 22	1.84
	2018 06 27	< 1.5
	2018 09 19	4.5
	2018 11 21	2.0

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
CM_MW3-SH	2018 03 27	14.8
	2018 06 25	15.1
	2018 09 20	14.8
	2018 11 15	15.9

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
CM_MW3-DP	2018 03 27	5.0
	2018 06 25	4.8
	2018 09 20	4.2
	2018 11 15	< 1.5

Primary Screening Criteria	Sulphate mg/L
CSR Aquatic Life	1,280-4,290
CSR Irrigation Watering	n/a
CSR Livestock Watering	1,000
CSR Drinking Water	500

LEGEND

Well Location

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Rock Drain
- Lake
- River Bed
- Wetland

Site Features
- Tailings/Settling Pond
- Reservoir
- Study Areas
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
** applicable at EV_Ocgw

References:
1. Data provided by Teck Coal Ltd.
2. © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Dissolved Sulphate in Groundwater- Study Area 11

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1:50,000 | Ref Num: | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-341

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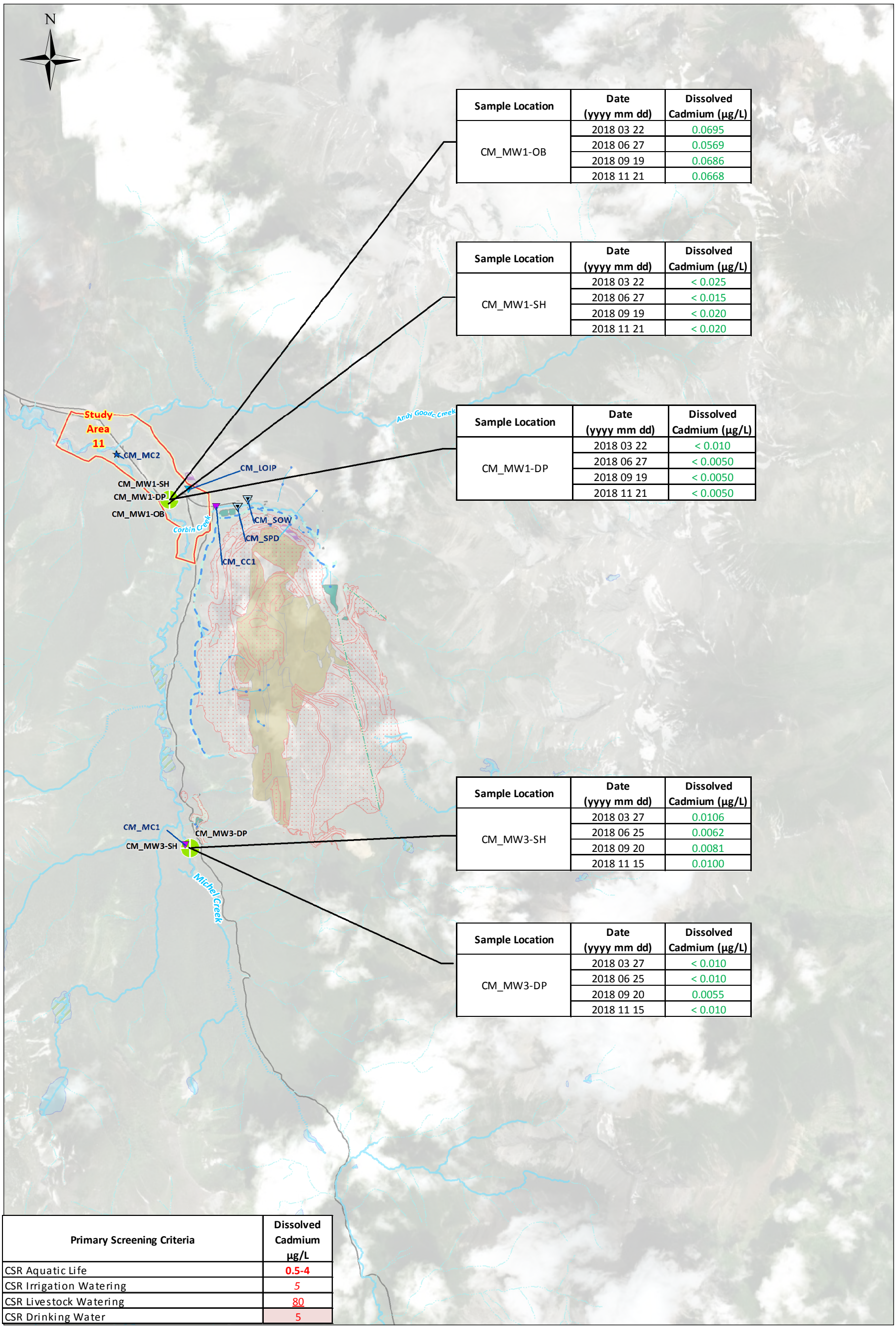

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
CM_MW1-OB	2018 03 22	0.0695
	2018 06 27	0.0569
	2018 09 19	0.0686
	2018 11 21	0.0668

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
CM_MW1-SH	2018 03 22	< 0.025
	2018 06 27	< 0.015
	2018 09 19	< 0.020
	2018 11 21	< 0.020

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
CM_MW1-DP	2018 03 22	< 0.010
	2018 06 27	< 0.0050
	2018 09 19	< 0.0050
	2018 11 21	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
CM_MW3-SH	2018 03 27	0.0106
	2018 06 25	0.0062
	2018 09 20	0.0081
	2018 11 15	0.0100

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium (µg/L)
CM_MW3-DP	2018 03 27	< 0.010
	2018 06 25	< 0.010
	2018 09 20	0.0055
	2018 11 15	< 0.010

Primary Screening Criteria	Dissolved Cadmium µg/L
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

LEGEND

Well Location

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Rock Drain
- Lake
- River Bed
- Wetland

Site Features
- Tailings/Settling Pond
- Reservoir
- Study Areas
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
** applicable at EV_Ocgw

References:
1. Data provided by Teck Coal Ltd.
2. © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS

Revisons:
0 - AO - 2019-04-18 -DRAFT - STH
1 - AO - 2019-05-14 - FINAL - STH

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Dissolved Cadmium in Groundwater – Study Area 11

CHK'D: STH | DATE: 2019/05/16 | SCALE: 1:50,000 | Ref Num: | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 661460-342

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Appendix I

Permit Requirements and Report Structure

The 2018 Annual Report for the RGMP has been prepared following the approved 2015 RGMP (SNC-Lavalin, 2015) and the annual groundwater reporting requirements listed in Section 10.4 of Permit 107517. The following table presents a checklist identifying the annual groundwater monitoring requirements listed in Section 10.4 of Permit 107517 and the Section(s) in the report in which the requirements are fulfilled.

Table I-1: Summary of the Report Structure

Description of Permit Requirement	Relevant Report Section
i. A map of monitoring locations with EMS and Permittee descriptors;	Sections 2.2; Drawings 664160-308 to 311
ii. Cross sections showing well installation details, stratigraphy, groundwater elevations, and flow. Cross sections should be in the direction of groundwater flow and perpendicular to groundwater flow;	Drawings 664160-312 to 326
iii. Drawings showing locations and water quality data of groundwater sampling points;	Drawings 664160-327 to 342
iv. A summary of background information on that year's program, including discussion of program modifications relative to previous years; and	Sections 2.0 and 4.1
v. A summary of measured parameters, including appropriate graphs and comparison of result to, Approved and Working Water Quality Guidelines, or other criteria and benchmarks as specified by the Director;	Sections 4.2 to 4.13; Appendix VI
vi. If applicable, a summary of exceedances of screening benchmarks;	Sections 4.2 to 4.13
vii. Evaluation and discussion of spatial patterns and temporal trends;	Sections 4.2 to 4.13
viii. A summary of all QA/QC issues for the year; and	Section 4.16
ix. Recommendations for further study or measures to be taken.	Section 5

Appendix II

Summary of SSGMP 2018 Annual Reports and Regional Conceptual Site Model

- Appendix II-1: FRO 2018 Site-Specific Groundwater Monitoring Program Summary and Recommendations
- Appendix II-2: GHO 2018 Site-Specific Groundwater Monitoring Program Summary and Recommendations
- Appendix II-3: LCO 2018 Site-Specific Groundwater Monitoring Program Summary and Recommendations
- Appendix II-4: EVO 2018 Site-Specific Groundwater Monitoring Program Summary and Recommendations
- Appendix II-5: CMO 2018 Site-Specific Groundwater Monitoring Program Summary and Recommendations
- Appendix II-6: Quality Assurance/Quality Control (QA/QC)

Appendix II-1: Fording River Operations 2018 Site-Specific Groundwater Monitoring Program

Summary

SNC-Lavalin completed the 2018 Annual Report for the FRO SSGMP (SNC-Lavalin, 2019a). The following information was taken from the 2018 FRO Annual Report.

Hydrogeology in the conceptual site model (CSM) was described with respect to the Fording River valley bottom setting with valley bottom tributaries including Henretta and Kilmarnock creeks and mountain tributaries including Clode, Lake Mountain, Cataract, and Swift creeks.

The FRO SSGMP includes fourteen monitoring wells that are monitored and sampled quarterly for a specific list of analytes. The wells monitored and sampled as part of the 2018 annual program are shown on Drawing 662795-002 attached. A summary of wells included in each drainage area is provided in Table 1; manual water level measurements provided in Table 2; field parameters in Table 3; and analytical results compared to screening criteria in Tables 4 and 5. Analytical results for select constituents of interest (CI), including nitrate-nitrogen, sulphate and dissolved selenium, are shown on Drawings 662795-007 to -009, attached.

A summary of the 2018 Annual Report for the FRO SSGMP is as follows:

- In 2018, quarterly groundwater monitoring and sampling events were completed at each of the fifteen wells with three exceptions: the Q1 sample from FR_HMW5 could not be collected because the well was frozen; the Q1 sample from FR_09-01-A could not be collected because the well was dry; and, the Q1 sample from FR_TT43 was not collected because it was not yet included in the program. Samples from the site-specific program were submitted for all parameters on the SSGMP analyte list.
- The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report. With the exception of one RPD value greater than 50% for one parameter, the remaining RPD values were less than 50%. The laboratory quality control reports were reviewed and the data were considered reliable. Detectable concentrations of select parameters in trip and field blanks were, for the most part, marginally above the detection limit or well below applicable primary screening criteria and did not affect the reliability of the data.
- Review of continuous groundwater elevation data indicated groundwater elevations follow a seasonal trend with higher groundwater levels recorded in spring months. Seasonal variation in groundwater elevations ranged from 0.03 m to 7.1 m.

Groundwater quality was similar to previous years, with notable conclusions listed below by drainage.

Henretta Creek Valley

- Groundwater quality results from the Henretta Valley reference well FR_HMW5 were below the primary screening criteria for each CI; however, concentrations of dissolved selenium have been continuously measured above the detection limit since May 2016 and sulphate concentrations measured in Q3 2018 were the highest recorded since sampling began. Concentrations of dissolved selenium and sulphate in adjacent surface water (FR_HC3) have also been increasing. Continued monitoring is recommended to evaluate the significance of these increases. Evaluation of this well as an appropriate reference well should occur under the RGMP.
- Groundwater samples from the Henretta Valley monitoring well FR_HMW2, installed in spoils, had CI concentrations above primary screening criteria and dissolved selenium above select secondary screening criteria. Both sulphate and dissolved selenium concentrations at FR_HMW2 were the highest measured at FRO and since monitoring began. In contrast, nitrate concentrations displayed a decreasing trend.
- Shallow and deep monitoring wells FR_HMW1S/D, installed in the backfilled Henretta Pits had CI greater than primary screening criteria in each quarter in both wells, with the exception of dissolved selenium in Q2. Dissolved selenium was also greater than secondary screening criteria in select quarters. Similar to FR_HMW2, concentrations of sulphate were increasing and concentrations of nitrate were decreasing, but dissolved selenium concentrations were similar to previous years.
- Because CI concentrations in surface water at downstream station FR_HC1 were lower than at monitoring wells FR_HMW2 and FR_HMW3, it is concluded that there is limited loading to Henretta Creek from groundwater in the area of the backfilled pits and spoils. This suggests that groundwater systems in the backfilled pits are separate from the shallow surficial flow system and attenuation in groundwater may be occurring.

Fording River Valley

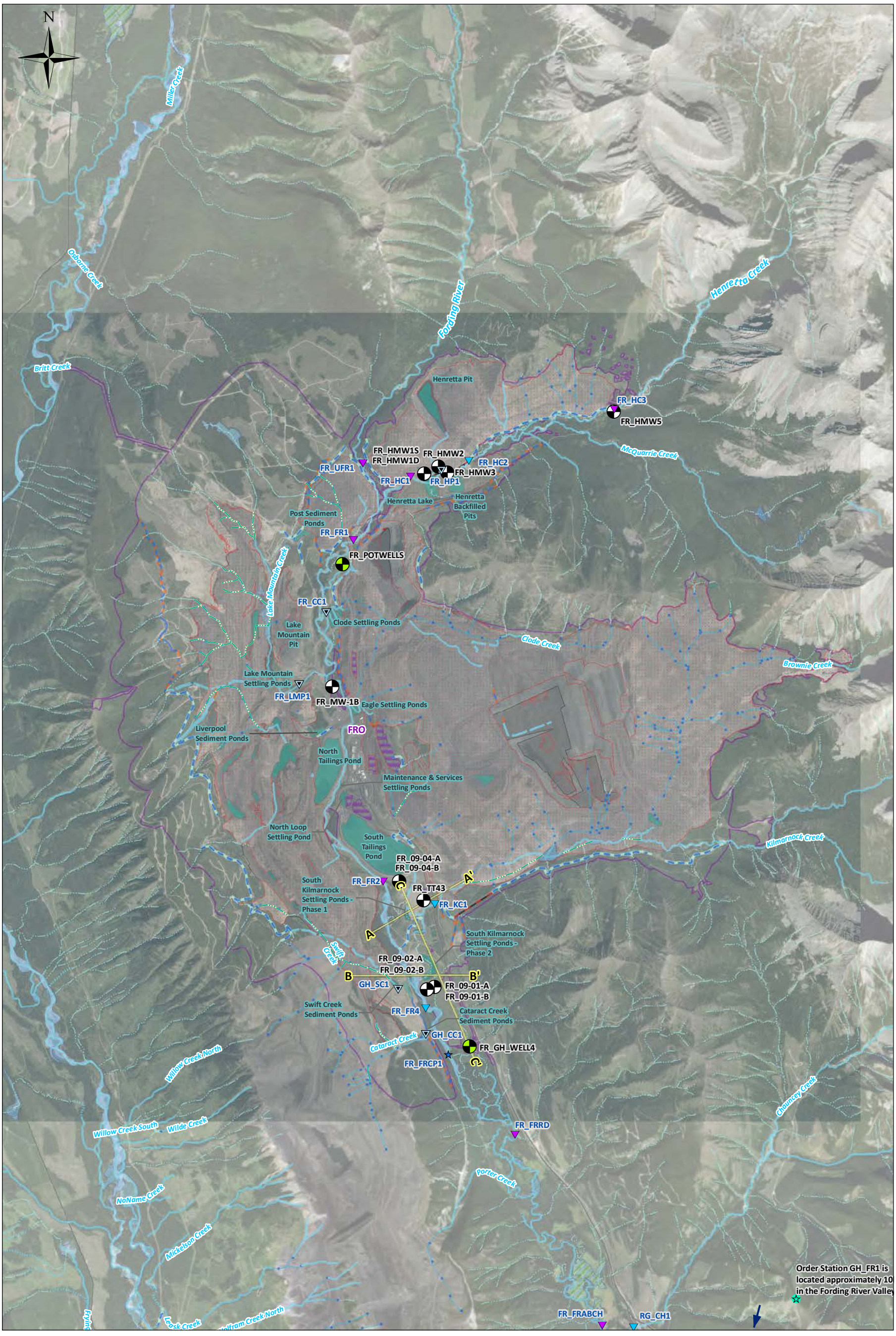
- Groundwater from the Fording River Valley north of the STP (i.e., FR_POTWELLS and FR_MW-1B) is hydraulically connected to surface water and the Fording River is a source of groundwater recharge and considered the main transport pathway for CI. In FR_POTWELLS, groundwater had dissolved selenium concentrations greater than the primary screening criteria in each quarter. Selenium concentrations in groundwater follow the same seasonal variation as surface water concentrations measured at upgradient surface water sampling location FR_FR1. At monitoring well FR_MW-1B, downgradient of Clode and Lake Mountain Creek confluences with the Fording River, nitrate (Q1, Q4) and dissolved selenium (Q1 to Q4) were above the primary screening criteria and selenium was above select secondary screening criteria in one quarter. CI concentrations above screening criteria in FR_MW-1B were higher than those in FR_POTWELLS and upstream surface water at FR_FR1, probably due to CI transport from the Clode Creek drainage to the Fording River valley-bottom groundwater.
- In the Fording River Valley downgradient of the STP, groundwater was sampled from monitoring wells FR_09-01-A/B, FR_09-02-A/B, FR_09-04-A/B, FR_TT43, and FR_GH_WELL4. In wells FR_09-01-A/B, FR_09-02-A/B, FR_TT43, and FR_GH_WELL4 dissolved selenium, sulphate (FR_TT43 only) and nitrate concentrations were greater than primary and secondary screening criteria in most quarters. In wells FR_09-04-A/B, directly downgradient of the STP, CI concentrations were below primary screening criteria in 2018 and were probably low due to attenuation in the STP. Upland groundwater flow and surface water infiltration from Kilmarnock Creek drainage remains a major source of mining-related constituents to Fording River valley-bottom groundwater in the area downgradient of the STP and is probably contributing to elevated CIs at monitoring wells FR_TT43, FR_09-01-A/B, FR_09-02-A/B, and FR_GH_WELL4.

Constituents other than CI that were measured above primary screening criteria were dissolved manganese, lithium, and uranium. Dissolved manganese concentrations above the primary screening criteria are associated with low DO concentrations in deep wells with limited exposure to atmospheric oxygen. Dissolved lithium concentrations are interpreted to be naturally occurring and are greater than the CSR DW standard in 93% of the wells in the Elk Valley. Uranium was not identified as a CI related to mining activities and probably originates from localized, natural sources.

Recommendations

SNC-Lavalin has the following recommendations for future groundwater monitoring and sampling:

- For nested wells, monitor wells on the same day, one right after the other, and collect manual depth to groundwater measurements for each well prior to purging rather than purging and sampling one well and then moving to the paired well;
- Analyze trip blanks for dissolved organic carbon (DOC) and the same dissolved metals package as site samples;
- When possible, avoid collecting samples in back to back months between quarter (i.e. June of Q2 and July of Q3) and instead evenly space sampling events throughout the year;
- Complete a QA/QC on laboratory results as they come in to identify hold-time and other errors that may arise to rectify in the subsequent sampling event;
- Wells, FR_KB-1A, FR_KB-2A, and FR_KB-3A/B, installed in the Kilmarnock alluvial fan in 2018 should be evaluated as a possible replacement for FR_TT43;
- Once approved, implement the 2018 SSGMP Update; and
- Continue to monitor increases of sulphate and dissolved selenium in reference well FR_HMW5 and re-assess this well as a reference well under the RGMP.



Groundwater Stations
- Monitoring Well
- Supply Well

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Geological Cross Sections
- Tailings/Settling Pond
- Secondary Road
- FRO Permitted Boundary
- Pit
- Stockpiles
- Waste Dump (Spoils)

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline

- Pond
- Island
- Lake
- River Bed
- Wetland

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Information provided by Teck Coal Ltd.
2. Mapped Aquifers are from Water Resources Atlas (BC ENV)
3. 2018 ortho-image client provided

Revisons:
0 - AO - 2019-02-05 - DRAFT - KM

0 0.5 1 2 3 Kilometers

PROJECT LOCATION: Fording River Operations, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Site Features and Sample Location Plan

CHK'D: KM	DATE: 2019/03/28	SCALE: 1:60,000	Ref Num:	REV: 0
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		622795-002	

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Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\662795_FRO_SSGMP

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_HMW5	2018 06 06	0.345
	2018 07 18	2.27
	2018 12 18	0.318

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_HMW2	2018 01 30	[650 SPO-CP]
	2018 06 06	[891 SPO-CP]
	2018 08 01	[705 SPO-CP]
	2018 12 17	[725 SPO-CP]

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_HMW3	2018 01 25	61.2
	2018 06 07	73.5 SPO
	2018 07 18	62.9
	2018 12 11	62.9

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_HMW1S	2018 01 25	[203 SPO-CP]
	2018 06 12	[262 SPO-CP]
	2018 07 18	[255 SPO-CP]
	2018 12 11	[238 SPO-CP]

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_HMW1D	2018 01 24	[118 SPO]
	2018 06 12	7.31
	2018 07 18	13.7
	2018 12 11	[61.7]

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_POTWELLS	2018 02 20	31.6
	2018 06 12	10.5
	2018 08 02	11.8
	2018 12 27	24.6

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_MW-1B	2018 02 14	[57]
	2018 06 13	20.6
	2018 08 01	24
	2018 12 19	47.6

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_09-04-A	2018 01 31	0.118
	2018 06 13	0.177
	2018 08 01	0.188
	2018 12 12	0.204

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_09-04-B	2018 01 31	0.185
	2018 06 13	0.13
	2018 08 01	0.261
	2018 12 12	0.218

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_TT43	2018 06 14	[113 SPO]
	2018 08 02	[111 SPO]
	2018 12 18	[281 SPO-CP]

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_09-01-A	2018 06 13	[106 SPO]
	2018 07 31	[81.2 SPO]
	2018 12 13	38.1

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_09-01-B	2018 02 22	[53.5]
	2018 06 13	[97.1 SPO]
	2018 07 31	[79.4 SPO]
	2018 12 13	41.8

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_09-02-A	2018 02 22	[52.8]
	2018 06 13	[96.3 SPO]
	2018 07 31	33
	2018 12 13	49.2

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_09-02-B	2018 02 08	49.9
	2018 06 13	[87.8 SPO]
	2018 07 31	49
	2018 12 13	45

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
FR_GH_WELL4	2018 01 31	[109 SPO]
	2018 06 14	[77 SPO]
	2018 07 31	[76.9 SPO]
	2018 12 13	[99.2 SPO]

Primary Screening Criteria	Dissolved Selenium (µg/L)
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10

Secondary Screening Criteria	Dissolved Selenium (µg/L)
Guideline for Canadian Drinking Water Quality	[50]
Site Performance Objective: GH_FR1 (0200378)	63 SPO
Compliance Point: FR_FRCP1 (E300071)	130 CP

FR_HMW5
FR_HMW2
FR_HMW3
FR_HMW1S
FR_HMW1D
FR_POTWELLS
FR_MW-1B
FRO
FR_09-04-A
FR_09-04-B
FR_TT43
FR_09-01-A
FR_09-01-B
FR_09-02-A
FR_09-02-B
FR_GH_WELL4

Order Station GH_FR1 is located approximately 10km SW in the Fording River Valley

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Rock Drain
- Island
- Lake
- River Bed
- Wetland
- Culvert
- Ditch
- Rock Drain
- Water Pipeline

Site Features
- FRO Permitted Boundary
- Pond
- River Bed
- Secondary Road
- Topographic Contours (100m)
- Tailings/Settling Pond

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
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2. Original in colour.
3. Site location is approximate.

References:
1. Information provided by Teck Coal Ltd.
2. 2018 ortho-image client provided

Revisons:
0 - AO - 2019-01-31 - DRAFT - KM

0 0.5 1 2 3 Kilometers

PROJECT LOCATION: Teck Coal Ltd

CLIENT NAME: Fording River Operations, BC

SNC·LAVALIN

Spatial Distribution of Dissolved Selenium in Groundwater

CHK'D: KM | DATE: 2019/03/28 | SCALE: 1:60,000 | Ref Num: | REV: 0
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 662795-007

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\662795_FRO_SSGMP\662795-007_ConsitinGW_FRO_ex1_Sel.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\662795_FRO_SSGMP

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_HMW5	2018 06 06	< 0.0050
	2018 07 18	< 0.0050
	2018 12 18	0.0054

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_HMW2	2018 01 30	96.5
	2018 06 06	72
	2018 08 01	69.5
	2018 12 17	66.5

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_HMW3	2018 01 25	8.43
	2018 06 07	14.7
	2018 07 18	8.92
	2018 12 11	9.9

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_HMW1S	2018 01 25	150
	2018 06 12	157
	2018 07 18	149
	2018 12 11	127

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_HMW1D	2018 01 24	152
	2018 06 12	148
	2018 07 18	150
	2018 12 11	134

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_POTWELLS	2018 02 20	5.75
	2018 06 12	1.64
	2018 08 02	1.93
	2018 12 27	3.99

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_MW-1B	2018 02 14	17.5
	2018 06 13	5.64
	2018 08 01	6.65
	2018 12 19	16.5

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_09-04-A	2018 01 31	0.0921
	2018 06 13	0.089
	2018 08 01	0.295
	2018 12 12	0.286

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_09-04-B	2018 01 31	0.0774
	2018 06 13	0.664
	2018 08 01	0.915
	2018 12 12	0.266

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_TT43	2018 06 14	26.8
	2018 08 02	35.4
	2018 12 18	78.7

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_09-01-A	2018 06 13	31.6
	2018 07 31	24
	2018 12 13	11.5

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_09-01-B	2018 02 22	17
	2018 06 13	29.3
	2018 07 31	28.4
	2018 12 13	12.8

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_09-02-A	2018 02 22	15.7
	2018 06 13	31
	2018 07 31	9.87
	2018 12 13	15.5

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_09-02-B	2018 02 08	12.7
	2018 06 13	31
	2018 07 31	15.9
	2018 12 13	13.8

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
FR_GH_WELL4	2018 01 31	40.4
	2018 06 14	22.4
	2018 07 31	30.9
	2018 12 13	31.6

Sample Location	Nitrate Nitrogen (mg/L)
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

FR_HMW5
FR_HMW2
FR_HMW3
FR_HMW1S
FR_HMW1D
FR_POTWELLS
FR_MW-1B
FRO
FR_09-04-A
FR_09-04-B
FR_TT43
FR_09-01-A
FR_09-01-B
FR_09-02-A
FR_09-02-B
FR_GH_WELL4

Order Station GH_FR1 is located approximately 10km SW in the Fording River Valley

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Island
- Lake
- River Bed
- Wetland
- Culvert
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- Rock Drain
- Water Pipeline

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- FRO Permitted Boundary
- Pond
- River Bed
- Secondary Road
- Topographic Contours (100m)
- Tailings/Settling Pond

Q4 | Q1
Q3 | Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

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Revisons:
0 - AO - 2019-01-31 - DRAFT - KM

0 0.5 1 2 3 Kilometers

PROJECT LOCATION: Teck Coal Ltd

CLIENT NAME: Fording River Operations, BC

SNC·LAVALIN

Spatial Distribution of Nitrate Nitrogen in Groundwater

CHK'D: KM | DATE: 2019/03/28 | SCALE: 1:60,000 | Ref Num: | REV: 0
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 662795-008

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\662795_FRO_SSGMP\662795-008_ConsiltinGW_FRO_ex1_Nit.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\662795_FRO_SSGMP

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_HMW5	2018 06 06	50.3
	2018 07 18	51.4
	2018 12 18	48.7

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_HMW2	2018 01 30	1,720
	2018 06 06	1,830
	2018 08 01	1,990
	2018 12 17	1,700

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_HMW3	2018 01 25	253
	2018 06 07	263
	2018 07 18	203
	2018 12 11	251

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_HMW1S	2018 01 25	1,710
	2018 06 12	1,810
	2018 07 18	1,790
	2018 12 11	1,640

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_HMW1D	2018 01 24	1,740
	2018 06 12	1,830
	2018 07 18	1,910
	2018 12 11	1,850

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_POTWELLS	2018 02 20	186
	2018 06 12	58.1
	2018 08 02	77.2
	2018 12 27	147

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_MW-1B	2018 02 14	218
	2018 06 13	82.5
	2018 08 01	109
	2018 12 19	203

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_09-04-A	2018 01 31	348
	2018 06 13	396
	2018 08 01	386
	2018 12 12	352

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_09-04-B	2018 01 31	350
	2018 06 13	392
	2018 08 01	418
	2018 12 12	353

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_TT43	2018 06 14	219
	2018 08 02	271
	2018 12 18	619

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_09-01-A	2018 06 13	239
	2018 07 31	226
	2018 12 13	297

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_09-01-B	2018 02 22	378
	2018 06 13	222
	2018 07 31	311
	2018 12 13	262

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_09-02-A	2018 02 22	287
	2018 06 13	247
	2018 07 31	169
	2018 12 13	288

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_09-02-B	2018 02 08	270
	2018 06 13	252
	2018 07 31	223
	2018 12 13	274

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
FR_GH_WELL4	2018 01 31	269
	2018 06 14	207
	2018 07 31	207
	2018 12 13	271

Sample Location	Sulphate (mg/L)
CSR Aquatic Life	1,280-4,290
CSR Irrigation Watering	n/a
CSR Livestock Watering	1000
CSR Drinking Water	500

Order Station GH_FR1 is located approximately 10km SW in the Fording River Valley

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Revisons:
0 - AO - 2019-01-31 - DRAFT - KM

0 0.5 1 2 3 Kilometers

PROJECT LOCATION: Teck Coal Ltd

CLIENT NAME: Fording River Operations, BC

SNC·LAVALIN

Spatial Distribution of Sulphate in Groundwater

CHK'D: KM	DATE: 2019/03/28	SCALE: 1:60,000	Ref Num:	REV: 0
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		662795-009	

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\662795_FRO_SSGMP\662795-009_ConsitinGW_FRO_Sul.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\662795_FRO_SSGMP

TABLE 1: Summary of Groundater Monitoring Program Locations

Area	Well ID	Monitoring Program	Well Type	Coordinates (UTM NAD 83)		LIDAR Ground Elevation	Ground Elevation	TOC Elevation	Stick Up Height	Drilled Depth	Well Diameter	Top of Screen Depth	Bottom of Screen Depth	Screened Formation	Depth to Bedrock	Hydraulic Conductivity
				Easting	Northing	masl	masl	masl	m	mbgs	mm	mbgs	mbgs		mbgs	m/s
Henretta Valley	FR_HMW1S	SSGMP	Monitoring	652441	5566518	1735.42	1732.30	1733.02	0.72	33.5	51	29.9	32.5	Gravel	33.5	-
	FR_HMW1D	SSGMP	Monitoring	652437	5566516	1734.87	1732.20	1732.97	0.77	54.3	51	51.2	54.3	Gravel / Coal / Bedrock	53.9	1.0E-04
	FR_HMW2	SSGMP	Monitoring	652666	5566634	1769.18	1767.30	1768.04	0.74	48.8	51	43.3	46.3	-	47.7	3.0E-03
	FR_HMW3	SSGMP	Monitoring	652810	5566540	1781.95	1728.20	1729.01	0.81	22.6	51	16.7	19.7	Silty Gravel	22.6	7.0E-04
	FR_HMW5	SSGMP, RGMP	Monitoring	655476	5567514	1793.23	1785.20	1786.03	0.83	12.6	51	7.30	10.40	Gravel	10.7	8.0E-03 9.0E-05
Fording River Valley	FR_POTWELLS[a]	SSGMP	Supply	651152	5565133	1686.77	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B	SSGMP	Monitoring	650966	5563112	1670.16	1652.00	1652.67	0.67	8.2	51	5.2	8.2	Clay / Bedrock	7.3	4.0E-04
	FR_09-04-A	SSGMP	Monitoring	652033	5560000	1605.52	1604.98	1605.89	0.91	5.0	51	1.14	4.66	Sandy Gravel	-	3.0E-03
	FR_09-04-B	SSGMP	Monitoring	652033	5560000	1605.52	1605.03	1605.57	0.54	7.0	51	5.10	6.62	Gravel	6.5	9.6E-05
	FR_TT43	SSGMP	Monitoring	652427	5559690	1613.50	-	-	-	10.97	50.8	6.12	7.62	Gravel	-	-
	FR_09-02-A	SSGMP	Monitoring	652482	5558261	1584.95	1584.69	1585.51	0.82	11.5	51	8.30	11.35	Sandy Gravel	-	1.0E-03
	FR_09-02-B	SSGMP	Monitoring	652842	5558261	1584.95	1584.73	1585.40	0.67	30.0	51	20.81	22.33	Gravel	-	9.9E-05
	FR_09-01-A	SSGMP, RGMP	Monitoring	652601	5558300	1584.64	1584.10	1584.95	0.85	8.4	51	3.83	6.88	Sandy Gravel	-	1.0E-03
	FR_09-01-B	SSGMP, RGMP	Monitoring	652601	5558300	1584.64	1584.10	1584.86	0.76	29.0	51	17.15	18.67	Gravel	-	1.5E-04
	FR_GH_WELL4[b]	SSGMP, RGMP	Supply	653150	5557337	1576.45	1575.80	-	-	29.0	-	25.90	28.95	Sand and Gravel	-	-

Notes:
a) FR_POTWELLS consists of six wells (FR_PW91, FR_PW92, FR_PW93, FR_PW94, FR_PW95, FR_PW96). Details for for FR_PW91 are provided above.
b) As a recommendation of the hydrogeological assessment, monitoring of a dedicated well from FR_GHHW (FR_GH_WELL4) began in Q4 2017. Details for FR_GH_WELL4 are provided above.

masl = metres above sea level
mbgs = metres below ground surface

TABLE 2: Summary of Groundwater Elevations and Calculated Vertical Gradients

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Water Level Elevation	Well Pairs	Date of Static Water Level Measurement	Calculated Vertical Gradient
		masl	masl	m	yyyy/mm/dd	mtoc	masl		yyyy/mm/dd	m/m
Henretta Valley	FR_HMW1S	1732.30	1733.02	0.72	2018/01/25	15.444	1717.576	FR_HMW1S and FR_HMW1D[c]	2018/01/25	-
					2018/06/12	14.40	1718.62		2018/06/12	-0.029
					2018/07/18	15.27	1717.75		2018/07/18	-0.004
					2018/12/11	15.74	1717.28		2018/12/11	0.029
	FR_HMW1D	1732.20	1732.97	0.77	2018/01/24	15.229	1717.741			
					2018/06/12	14.97	1718			
					2018/07/18	15.30	1717.67			
					2018/12/11	15.07	1717.9			
	FR_HMW2	1767.30	1768.04	0.74	2018/01/30	45.140	1722.9			
					2018/06/06	45.03	1723.01			
					2018/08/01	45.07	1722.97			
					2018/12/17	45.90	1722.14			
	FR_HMW3	1728.20	1729.01	0.81	2018/01/25	7.854	1721.156			
					2018/06/07	7.35	1721.66			
					2018/07/18	7.568	1721.442			
					2018/12/11	7.61	1721.4			
	FR_HMW5	1785.20	1786.03	0.83	2018/06/06	0.555	1785.475			
					2018/07/18	1.60	1784.43			
					2018/12/18	1.593	1784.437			
Fording River Valley	FR_POTWELLS[a]	-	-	-	-	-	-			
	FR_MW-1B	1652.00	1652.67	0.67	2018/02/14	2.216	1650.454			
					2018/06/13	1.99	1650.680			
					2018/08/01	2.12	1650.550			
					2018/12/19	2.12	1650.550			
	FR_09-04-A	1604.98	1605.89	0.91	2018/01/31	2.163	1603.727	FR_09-04-A and FR_09-04-B	2018/01/31	-0.154
					2018/06/13	2.14	1603.750		2018/06/13	-0.155
					2018/08/01	2.166	1603.724		2018/08/01	-0.158
					2018/12/12	2.15	1603.743		2018/12/12	-0.122
	FR_09-04-B	1605.03	1605.57	0.54	2018/01/31	2.290	1603.280			
					2018/06/13	2.27	1603.300			
					2018/08/01	2.305	1603.265			
					2018/12/12	2.183	1603.387			
	FR_TT43	-	-	-	2018/06/14	4.980	-			
					2018/08/02	4.742	-			
					2018/12/18	6.170	-			
	FR_09-02-A	1584.69	1585.51	0.82	2018/02/22	9.483	1576.027	FR_09-02-A and FR_09-02-B[c]	2018/02/08	-
					2018/06/13	2.31	1583.200		2018/06/13	-0.099
					2018/07/31	4.391	1581.119		2018/07/31	-0.082
					2018/12/13	6.22	1579.290		2018/12/13	-0.097
	FR_09-02-B	1584.73	1585.40	0.67	2018/02/08	9.878	1575.522			
					2018/06/13	3.36	1582.040			
					2018/07/31	5.236	1580.164			
					2018/12/13	7.25	1578.150			
	FR_09-01-A	1584.10	1584.95	0.85	2018/02/22	DRY	N/A	FR_09-01-A and FR_09-01-B	2018/02/22	N/A
					2018/06/13	1.72	1583.230		2018/06/13	-0.052
					2018/07/31	3.73	1581.220		2018/07/31	-0.053
					2018/12/13	5.47	1579.480		2018/12/13	-0.066
	FR_09-01-B	1584.10	1584.86	0.76	2018/02/22	9.191	1575.669			
					2018/06/13	2.28	1582.580			
					2018/07/31	4.31	1580.550			
					2018/12/13	6.21	1578.650			
	FR_GH_WELL4[b]	1575.80	-	-	-	-	-			

Notes:

a) FR_POTWELLS consists of six wells (FR_PW91, FR_PW92, FR_PW93, FR_PW94, FR_PW95, FR_PW96). Details for for FR_PW91 are provided above.

b) As a recommendation of the hydrogeological assessment, monitoring of a dedicated well from FR_GHHW (FR_GH_WELL4) began in Q4 2017. Details for FR_GH_WELL4 are provided above.

masl = metres above sea level

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TABLE 3: Field-Measured Parameters

Sample Location	Sample Date (yyyy mm dd)	Field Parameters				
		Temperature °C	pH pH	ORP mV	Dissolved Oxygen mg/L	Conductivity µS/cm
Henretta Valley						
FR_HMW1S	2018 01 25	3.1	6.83	209.8	0.22	3,776
	2018 06 12	3.6	6.67	195.8	0.54	3,636
	2018 07 18	4.1	6.84	134.9	1.00	3,433
	2018 12 11	3.3	6.94	260.0	2.34	3,298
FR_HMW1D	2018 01 24	3.2	6.84	257.1	0.42	3,589
	2018 06 12	4.0	6.67	230.4	1.37	3,712
	2018 07 18	4.2	6.82	142.7	0.24	3,535
	2018 12 11	3.7	7.01	246.3	4.66	3,265
FR_HMW2	2018 01 30	2.2	6.9	175.9	3.84	3,335
	2018 06 06	4.4	6.76	228.2	5.05	3,246
	2018 08 01	7.4	7.03	209.3	6.25	3,125
	2018 12 17	1.8	6.98	214.9	7.91	3,043
FR_HMW3	2018 01 25	3.2	7.35	25.2	2.23	842.5
	2018 06 07	3.3	6.92	101.2	3.32	862
	2018 07 18	4.6	7.31	33.5	2.19	709.0
	2018 12 11	3.3	7.39	94.5	4.75	749
FR_HMW5	2018 06 06	3.9	8.07	-46.5	0.28	352.2
	2018 07 18	5.5	8.19	-109.0	4.4	329.0
	2018 12 18	3.5	8.18	210.8	0.36	307.4
Fording River Valley						
FR_POTWELLS	2018 02 20	2.3	7.90	116.1	11.73	598.1
	2018 06 12	5.8	7.86	179.8	9.86	329.0
	2018 08 02	9.0	7.76	172.1	9.22	350.8
	2018 12 27	2.7	7.70	298.7	16.65	519.4
FR_MW-1B	2018 02 14	2.8	7.67	272.8	9.19	784.7
	2018 06 13	4.4	7.63	223.3	8.12	453.1
	2018 08 01	6.4	7.89	147.1	6.72	481.9
	2018 12 19	4.6	7.67	249.8	9.38	702.0
FR_09-04-A	2018 01 31	8.4	7.12	169.0	0.23	1,091
	2018 06 13	9.8	6.93	158.9	0.05	1,155
	2018 08 01	10.8	7.11	191.5	0.08	1,069
	2018 12 12	7.8	7.2	244.1	0.32	1,056
FR_09-04-B	2018 01 31	8.6	7.11	171.3	0.05	1,098
	2018 06 13	9.7	6.89	160.5	0.07	1,161
	2018 08 01	9.9	7.10	186.9	0.13	1,072
	2018 12 12	8.2	7.33	212.3	0.3	1,055
FR_TT43	2018 06 14	5.0	7.07	198.1	8.57	1,056
	2018 08 02	7.9	7.11	180.1	7.99	1,080
	2018 12 18	3.3	7.19	105.3	7.96	1,906
FR_09-02-A	2018 02 22	4.1	7.56	181.2	11.29	921
	2018 06 13	5.9	7.23	212.6	9.24	1,012
	2018 07 31	8.4	7.61	174.1	6.91	591.6
	2018 12 13	1.4	7.75	307.6	11.31	855.4
FR_09-02-B	2018 02 08	6.0	7.42	151.6	9.35	892
	2018 06 13	4.8	7.2	206.5	9.66	967
	2018 07 31	5.9	7.52	177.4	6.87	741.8
	2018 12 13	4.4	7.61	300.2	10.88	812.5
FR_09-01-A	2018 06 13	6.8	7.31	219.0	9.54	1,002
	2018 07 31	7.6	7.55	175.5	7.32	901
	2018 12 13	5.6	7.36	216.1	7.49	904
FR_09-01-B	2018 02 22	6.8	7.20	181.2	7.09	1,216
	2018 06 13	5.6	7.09	223.8	10.03	928
	2018 07 31	6.3	7.29	156.1	7.46	936
	2018 12 13	6.6	7.39	301.1	9.18	777
FR_GH_WELL4	2018 01 31	6.3	7.34	117.3	5.29	1,105
	2018 06 14	8.4	7.14	120.3	4.81	935
	2018 07 31	10.7	7.38	108.6	5.64	803
	2018 12 13	9.9	7.34	260.9	4.50	1,038

TABLE 4: Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Physical Parameters							Dissolved Inorganics														Organics	
		Laboratory pH	Hardness	Laboratory Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Ammonia, Total (as N)	Bromide	Chloride	Fluoride	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Total Phosphorous as P	Sulphate	Total Organic Carbon	Dissolved Organic Carbon
		pH	mg/L	µS/cm	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																								
CSR Aquatic Life (AW)[a]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,700-18,500[b]	n/a	1,500	2,000-3,000[c]	400	0.2-1[d]	n/a	n/a	n/a	1,280-4,290[c]	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	100	10	n/a	n/a	n/a	1,000	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	10	1	n/a	n/a	n/a	500	n/a	n/a
Henretta Valley																							
FR_HMW1D	2018 01 24	7.51	2,670	4,030	2.4	3,970	0.78	406	406	< 1.0	< 1.0	342	< 0.10	< 5.0	< 200	152	< 0.010	0.329	0.0033	0.0066	1,740	1.61	1.66
	2018 06 12	7.85	2,740	3,960	1.7	4,150	0.51	446	446	< 1.0	< 1.0	241	< 0.50	< 5.0	260	148	0.032	< 0.050	0.0026	0.0046	1,830	1.16	1.13
	2018 07 18	7.90	2,730	3,690	2.2	4,090	0.70	294	294	< 1.0	< 1.0	174	< 0.50	< 5.0	290	150	0.016	< 0.050	0.0011	0.0049	1,910	1.13	1.25
	2018 12 11	7.90	2,690	3,630	3.0	4,100	0.33	375	375	< 1.0	< 1.0	155	< 0.50	< 5.0	260	134	0.020	0.537	0.0203	0.0456	1,850	1.07	1.13
FR_HMW1S	2018 01 25	7.88	2,780	3,890	1.0	3,660	0.48	403	403	< 1.0	< 1.0	910	0.17	< 5.0	< 200	150	0.020	0.342	< 0.0010	0.0018	1,710	1.40	1.55
	2018 06 12	7.91	2,610	3,880	< 1.0	4,000	0.25	429	429	< 1.0	< 1.0	870	< 0.50	< 5.0	300	157	0.024	2.47	< 0.0010	0.0011	1,810	0.83	0.82
	Duplicate	7.89	2,620	3,850	1.5	4,060	0.36	426	426	< 1.0	< 1.0	880	< 0.50	< 5.0	280	155	0.018	< 0.050	0.0011	0.0023	1,780	0.88	0.89
	QA/QC RPD%	< 1	< 1	1	*	1	*	1	1	*	*	1	*	*	*	1	29	*	*	*	2	*	*
	2018 07 18	7.98	2,580	3,620	< 1.0	3,830	0.30	289	289	< 1.0	< 1.0	900	< 0.50	< 5.0	380	149	< 0.010	< 0.050	< 0.0010	0.0027	1,790	1.00	0.88
	2018 12 11	7.94	2,510	3,600	1.5	3,680	0.43	349	349	< 1.0	< 1.0	782	< 0.50	< 5.0	260	127	< 0.010	0.960	0.0147	0.0099	1,640	1.14	1.02
FR_HMW2	2018 01 30	7.84	2,540	3,640	70.9	3,380	53.8	385	385	< 1.0	< 1.0	8.2	< 0.25	< 2.5	< 100	96.5	< 0.0050	0.156	0.0106	0.0696	1,720	6.1	1.36
	2018 06 06	8.02	2,350	3,350	1.3	3,340	0.27	374	374	< 1.0	< 1.0	7.4	< 0.25	< 2.5	230	72.0	0.0059	0.36	0.0075	0.0095	1,830	< 0.50	< 0.50
	2018 08 01	7.94	2,510	3,010	144	3,670	93.2	403	403	< 1.0	< 1.0	6.6	< 0.25	< 2.5	180	69.5	0.0070	< 0.050	0.0087	0.125	1,990	0.82	0.60
	2018 12 17	7.78	2,630	3,260	19.8	3,550	15.4	403	403	< 1.0	< 1.0	11.8	< 0.25	< 2.5	170	66.5	0.0071	< 0.050	0.0269	0.0257	1,700	1.04	0.97
FR_HMW3	2018 01 25	8.19	487	881	1.0	617	1.66	194	194	< 1.0	< 1.0	87.3	< 0.050	< 0.50	228	8.43	0.0069	0.353	0.0010	0.0072	253	0.99	1.04
	2018 06 07	7.99	451	907	< 1.0	680	0.53	203	203	< 1.0	< 1.0	66.8	< 0.050	0.52	292	14.7	0.0049	0.439	0.0021	0.0062	263	0.67	0.75
	2018 07 18	8.00	431	787	< 1.0	572	0.63	189	189	< 1.0	< 1.0	117	< 0.050	< 0.50	319	8.92	0.0072	0.226	< 0.0010	0.0050	203	0.63	0.62
	2018 12 11	8.33	471	823	10.6	634	6.06	186	181	4.4	< 1.0	159	< 0.25	< 2.5	290	9.90	< 0.0050	0.350	0.0107	0.562	251	< 0.50	< 0.50
	Duplicate	8.03	458	820	4.7	653	4.44	186	186	< 1.0	< 1.0	147	< 0.25	< 2.5	280	9.69	< 0.0050	0.381	0.0073	0.448	247	< 0.50	< 0.50
	QA/QC RPD%	4	3	< 1	*	3	31	0	3	*	*	8	*	*	4	2	*	8	38	23	2	*	*
FR_HMW5	2018 06 06	8.30	191	374	< 1.0	217	0.13	165	160	4.8	< 1.0	57.5	< 0.050	0.82	536	< 0.0050	< 0.0010	< 0.050	0.0196	0.0230	50.3	1.62	0.92
	2018 07 18	8.38	179	372	< 1.0	237	0.11	154	151	3.4	< 1.0	67.5	< 0.050	0.77	528	< 0.0050	< 0.0010	< 0.050	0.0016	0.0185	51.4	< 0.50	< 0.50
	2018 12 18	8.21	192	366	< 1.0	233	0.40	151	151	< 1.0	< 1.0	64.0	< 0.050	0.93	545	0.0054	< 0.0010	0.130	0.0313	0.0207	48.7	< 0.50	< 0.50
Fording River Valley																							
FR_POTWELLS	2018 02 20	8.37	355	672	< 1.0	432	< 0.10	151	137	14.6	< 1.0	< 5.0	< 0.050	< 0.50	137	5.75	< 0.0010	0.241	0.0014	0.0019	186	< 0.50	< 0.50
	2018 06 12	8.15	181	358	< 1.0	246	0.15	129	129	< 1.0	< 1.0	5.5	< 0.050	< 0.50	211	1.64	< 0.0010	0.329	< 0.0010	0.0022	58.1	1.13	1.18
	2018 08 02	8.27	212	376	< 1.0	267	0.22	137	137	< 1.0	< 1.0	9.4	< 0.050	< 0.50	232	1.93	< 0.0010	0.212	0.0028	0.0045	77.2	0.58	0.60
	2018 12 27	8.09	302	536	< 1.0	375	0.87	144	144	< 1.0	< 1.0	19.6	< 0.050	< 0.50	202	3.99	< 0.0010	0.222	0.0076	0.0024	147	< 0.50	< 0.50
FR_MW-1B	2018 02 14	7.94	456	872	3.8	599	6.04	277	277	< 1.0	< 1.0	< 5.0	< 0.050	< 0.50	132	17.5	< 0.0010	< 0.050	0.0022	0.0050	218	0.65	0.67
	2018 06 13	8.37	261	470	1.6	322	2.35	148	142	5.6	< 1.0	< 5.0	< 0.050	< 0.50	193	5.64	0.0011	< 0.10	0.0021	0.0054	82.5	0.93	0.75
	2018 08 01	8.46	268	518	5.9	381	3.03	166	158	7.6	< 1.0	< 5.0	< 0.050	< 0.50	195	6.65	< 0.0010	0.161	0.0030	0.0061	109	0.79	0.76
	Duplicate	8.21	308	518	2.3	393	2.97	161	161	< 1.0	< 1.0	< 5.0	< 0.050	< 0.50	181	6.64	< 0.0010	0.103	0.0026	0.0064	108	0.95	0.96
	QA/QC RPD%	3	14	0	*	3	2	3	2	*	*	*	*	*	7	< 1	*	*	*	5	1	*	*
	2018 12 19	8.31	419	759	4.4	527	5.47	202	198	4.2	< 1.0	19.5	< 0.050	0.65	164	16.5	< 0.0010	0.219	0.0261	0.0069	203	< 0.50	< 0.50
	Duplicate	8.27	413	759	5.4	555	6.95	189	189	< 1.0	< 1.0	< 5.0	< 0.050	0.64	165	16.5	< 0.0010	0.315	0.0087	0.0064	203	< 0.50	< 0.50
	QA/QC RPD%	< 1	1	0	*	5	24	7	5	*	*	*	*	*	1	0	*	*	100	8	0	*	*

Associated data provided by Teck Coal.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference
* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with Hardness.
[d] Standard varies with Chloride.
[e] Standard varies with crop.
[f] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[h] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																														
		Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[h] µg/L
BC Standard																																
CSR Aquatic Life (AW)[a]		n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[c]	n/a	10[f]	40	20-90[c]	n/a	40-160[c]	n/a	n/a	n/a	0.25	10,000	250-1,500[c]	n/a	20	0.5-15[c]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[c]
CSR Irrigation Watering (IW)		5,000	n/a	100	n/a	100	n/a	500-6,000[e]	5	n/a	5[f]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	n/a
CSR Livestock Watering (LW)		5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[f]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)		9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[f]	20[g]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Henretta Valley																																
FR_HMW1D	2018 01 24	< 5.0	< 0.50	< 0.50	13.5	< 0.10	< 0.25	< 50	0.084	564	< 0.50	4.63	< 1.0	< 50	< 0.25	86.5	305	*513*	< 0.0050	0.94	36.2	8.03	***118***	< 0.050	2.38	337	< 0.050	< 0.50	< 10	*13.2*	< 2.5	7.7
	2018 06 12	< 3.0	0.36	< 0.20	11.2	< 0.040	< 0.10	51	0.085	561	< 0.20	4.80	1.12	< 20	< 0.10	92.6	325	*583*	< 0.0050	0.72	35.3	7.06	7.31	< 0.020	2.37	327	< 0.020	< 0.20	< 10	*12.8*	< 1.0	6.8
	2018 07 18	< 3.0	0.41	< 0.20	10.5	< 0.040	< 0.10	48	0.082	570	< 0.20	4.86	< 0.50	< 20	< 0.10	84.5	316	*642*	< 0.0050	0.76	34.1	6.56	13.7	< 0.020	2.33	325	< 0.020	< 0.20	< 10	*12.6*	< 1.0	7.0
	2018 12 11	< 3.0	0.39	< 0.10	11.8	< 0.020	< 0.050	52	0.0934	573	< 0.10	4.87	< 0.50	< 10	< 0.050	86.9	305	*700*	< 0.0050	0.757	32.9	7.09	***61.7***	< 0.010	2.46	344	0.015	< 0.10	< 10	*12.9*	< 0.50	7.3
FR_HMW1S	2018 01 25	< 3.0	0.35	< 0.20	12.1	< 0.040	< 0.10	45	0.118	571	< 0.20	4.75	0.85	< 20	< 0.10	91.9	330	*395*	< 0.0050	0.92	42.1	8.70	***203***	< 0.020	2.45	362	0.032	< 0.20	< 10	*11.1*	< 1.0	5.4
	2018 06 12	< 3.0	0.34	< 0.20	10.1	< 0.040	< 0.10	49	0.121	532	< 0.20	4.77	< 0.50	< 20	< 0.10	95.4	311	*366*	< 0.0050	0.92	42.9	7.98	***262***	< 0.020	2.24	316	0.032	< 0.20	< 10	*12.0*	< 1.0	5.4
	Duplicate	5.0	0.34	< 0.20	10.1	< 0.040	< 0.10	49	0.121	533	< 0.20	4.72	< 0.50	< 20	< 0.10	95.3	312	*361*	< 0.0050	0.93	42.0	7.68	***254***	< 0.020	2.26	320	0.035	< 0.20	< 10	*12.3*	< 1.0	5.5
	QA/QC RPD%	*	*	*	0	*	*	*	0	< 1	*	1	*	*	*	< 1	< 1	1	*	1	2	4	3	*	1	1	*	*	*	2	*	2
	2018 07 18	< 3.0	0.34	< 0.20	10.1	< 0.040	< 0.10	46	0.114	520	< 0.20	4.63	< 0.50	< 20	< 0.10	84.9	311	*366*	< 0.0050	0.90	41.0	7.63	***255***	< 0.020	2.21	300	0.031	< 0.20	< 10	*11.9*	< 1.0	5.5
	2018 12 11	< 3.0	0.33	< 0.20	12.0	< 0.040	< 0.10	47	0.117	528	< 0.20	4.31	< 0.50	< 20	< 0.10	84.9	289	*344*	< 0.0050	0.91	41.5	7.28	***238***	< 0.020	2.19	303	0.037	< 0.20	< 10	*12.4*	< 1.0	5.2
FR_HMW2	2018 01 30	< 3.0	< 0.20	< 0.20	14.0	< 0.040	< 0.10	51	0.254	530	< 0.20	0.23	< 0.50	< 20	< 0.10	129	296	85.1	< 0.0050	0.55	17.1	7.83	***650***	< 0.020	2.08	328	0.058	< 0.20	< 10	*10.7*	< 1.0	7.9
	2018 06 06	< 3.0	< 0.20	< 0.20	12.2	< 0.040	< 0.10	46	0.254	473	< 0.20	0.31	< 0.50	< 20	< 0.10	121	284	85.3	< 0.0050	0.44	16.8	7.55	***891***	< 0.020	1.94	281	0.058	< 0.20	< 10	*10.2*	< 1.0	7.1
	2018 08 01	3.1	< 0.20	< 0.20	11.9	< 0.040	< 0.10	50	0.241	527	< 0.20	0.21	1.07	< 20	< 0.10	127	291	62.5	< 0.0050	0.34	14.8	7.29	***705***	< 0.020	1.97	279	0.053	< 0.20	< 10	*10.6*	< 1.0	6.4
	2018 12 17	1.5	< 0.10	0.16	13.4	< 0.020	< 0.050	52	0.287	555	< 0.10	0.26	0.50	< 10	< 0.050	154	303	139	< 0.0050	0.283	13.1	7.90	***725***	< 0.010	2.41	287	0.048	< 0.10	< 10	9.46	< 0.50	7.6
FR_HMW3	2018 01 25	< 3.0	0.20	0.15	32.1	< 0.020	< 0.050	15	0.0295	118	< 0.10	0.18	< 0.50	108	< 0.050	30.9	46.4	116	< 0.0050	1.04	1.41	1.91	***61.2***	< 0.010	1.42	131	0.017	< 0.10	< 10	2.04	< 0.50	< 3.0
	2018 06 07	< 3.0	< 0.20	< 0.20	28.6	< 0.040	< 0.10	< 20	0.026	102	< 0.20	< 0.20	< 0.50	< 20	< 0.10	28.8	47.7	68.6	< 0.0050	1.01	1.4	1.83	***73.5***	< 0.020	1.04	98.8	< 0.020	< 0.20	< 10	2.15	< 1.0	< 2.0
	2018 07 18	< 3.0	0.19	< 0.10	27.5	< 0.020	< 0.050	15	0.0250	98.3	< 0.10	0.17	< 0.50	41	< 0.050	27.6	45.0	84.7	< 0.0050	1.02	1.24	1.95	***62.9***	< 0.010	1.22	101	0.013	< 0.10	< 10	1.98	< 0.50	1.5
	2018 12 11	< 3.0	0.18	0.14	35.7	< 0.020	< 0.050	15	0.0225	114	< 0.10	0.23	< 0.50	248	< 0.050	25.7	45.5	109	< 0.0050	1.09	1.25	2.02	***62.9***	< 0.010	1.45	132	< 0.010	< 0.10	< 10	2.07	< 0.50	< 1.0
	Duplicate	< 3.0	0.17	0.15	30.8	< 0.020	< 0.050	16	0.0263	110	< 0.10	0.24	< 0.50	242	< 0.050	27.9	44.5	109	< 0.0050	1.03	1.22	1.87	***62.1***	< 0.010	1.47	122	< 0.010	< 0.10	< 10	1.97	< 0.50	< 1.0
	QA/QC RPD%	*	*	*	15	*	*	*	*	4	*	*	*	2	*	8	2	0	*	6	*	8	1	*	1	8	*	*	*	5	*	*
FR_HMW5	2018 06 06	7.3	< 0.10	< 0.10	223	< 0.020	< 0.050	38	< 0.0050	42.0	< 0.10	< 0.10	< 0.50	< 10	< 0.050	177	20.9	51.2	< 0.00050	< 0.050	< 0.50	0.751	0.345	< 0.010	11.4	398	< 0.010	< 0.10	< 10	0.021	< 0.50	< 1.0
	2018 07 18	6.2	< 0.10	< 0.10	192	< 0.020	< 0.050	35	< 0.0050	39.8	< 0.10	< 0.10	< 0.50	< 10	< 0.050	160	19.3	46.9	< 0.00050	< 0.050	< 0.50	0.689	2.27	< 0.010	9.57	360	< 0.010	< 0.10	< 10	0.023	< 0.50	< 1.0
	2018 12 18	5.8	< 0.10	< 0.10	220	< 0.020	< 0.050	44	< 0.0050	42.4	< 0.10	< 0.10	< 0.50	15	< 0.050	176	20.9	49.4	< 0.00050	< 0.050	< 0.50	0.735	0.318	< 0.010	12.1	383	< 0.010	< 0.10	< 10	0.021	< 0.50	< 1.0
Fording River Valley																																
FR_POTWELLS	2018 02 20	< 3.0	< 0.10	< 0.10	87.6	< 0.020	< 0.050	< 10	0.0109	90.0	0.21	< 0.10	0.58	< 10	< 0.050	6.2	31.6	0.11	< 0.0050	0.591	< 0.50	0.626	***31.6***	< 0.010	0.756	162	< 0.010	< 0.10	< 10	1.09	< 0.50	< 3.0
	2018 06 12	< 3.0	< 0.10	< 0.10	46.8	< 0.020	< 0.050	< 10	0.0073	45.7	0.10	< 0.10	2.38	< 10	0.087	5.3	16.2	0.30	< 0.0050	0.687	< 0.50	0.562	10.5	< 0.010	0.559	84.1	< 0.010	< 0.10	< 10	0.674	< 0.50	7.4
	2018 08 02	< 3.0	< 0.10	< 0.10	59.7	< 0.020	< 0.050	< 10	0.0072	55.2	0.14	< 0.10	0.73	< 10	< 0.050	5.8	18.0	< 0.10	< 0.0050	0.732	< 0.50	0.681	11.8	< 0.010	0.616	103	< 0.010	< 0.10	< 10	0.780	< 0.50	4.1
	2018 12 27	< 3.0	< 0.10	< 0.10	75.0	< 0.020	< 0.050	< 10	0.0103	75.8	0.15	< 0.10	< 0.50	< 10	< 0.050	6.5	27.4	< 0.10	< 0.0050	0.631	< 0.50	0.602	***24.6***	< 0.010	0.698	134	< 0.010	< 0.10	< 10	1.02	< 0.50	2.0
FR_MW-1B	2018 02 14	< 3.0	0.13	< 0.10	129	< 0.020	< 0.050	< 10	0.0144	118	< 0.10	< 0.10	< 0.50	< 10	< 0.050	29.2	39.5	< 0.10	< 0.0050	1.04	< 0.50	1.05	***57***	< 0.010	1.47	184	< 0.010	< 0.10	< 10	2.44	< 0.50	< 3.0
	2018 06 13	< 3.0	0.16	< 0.10	80.5	< 0.020	< 0.050	< 10	0.0120	65.8	< 0.10	< 0.10	< 0.50	< 10	< 0.050	19.2	23.4	0.12	< 0.0050	1.08	< 0.50	1.02	***20.6***	< 0.010	1.07	108	< 0.010	< 0.10	< 10	1.22	< 0.50	11.8
	2018 08 01	< 3.0	0.15	< 0.10	90.9	< 0.020	< 0.050	< 10	0.0137	70.8	0.14	< 0.10	< 0.50	< 10	< 0.050	19.1	22.1	< 0.10	< 0.0050	0.980	< 0.50	1.06	***24***	< 0.010	1.05	110	< 0.010	< 0.10	< 10	1.50	< 0.50	< 1.0
	Duplicate	< 3.0	0.18	< 0.10	97.7	< 0.020	< 0.050	< 10	0.0132	77.4	0.15	< 0.10	< 0.50	< 10	< 0.050	21.0	27.8	< 0.10	< 0.0050	0.997	< 0.50	1.19	***25.1***	< 0.010	1.13	128	< 0.010	< 0.10	< 10	1.50	< 0.50	< 1.0
	QA/QC RPD%	*	*	*	7	*	*	*	*	9	*	*	*	*	*	9	23	*	*	2	*	12	4	*	7	15	*	*	*	0	*	*
	2018 12 19	< 3.0	0.14	< 0.10	128	< 0.020	< 0.050	< 10	0.0130	106	0.15	< 0.10	< 0.50	< 10	< 0.050	26.3	37.8	< 0.10	< 0.0050	1.03	< 0.50	1.08	***47.6***	< 0.010	1.41	170	< 0.010	< 0.10	< 10	2.19	< 0.50	1.3
	Duplicate	< 3.0	0.14	< 0.10	128	< 0.020	< 0.050	< 10	0.0125	105	0.15	< 0.10	< 0.50	< 10	< 0.050	25.4	36.7	< 0.10	< 0.0050	1.01	< 0.50	1.05	***49.3***	< 0.010	1.40	171	< 0.010	< 0.10	< 10	2.22	< 0.50	< 1.0
	QA/QC RPD%	*	*	*	0	*	*	*	*	1	*	*	*	*	*	3	3	*	*	2	*	3	4	*	1	1	*	*	*	1	*	*

Associated data provided by Teck Coal.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference
* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with Hardness.
[d] Standard varies with Chloride.
[e] Standard varies with crop.
[f] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[h] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Physical Parameters							Dissolved Inorganics													Organics	
		Laboratory pH	Hardness	Laboratory Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Ammonia, Total (as N)	Bromide	Chloride	Fluoride	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Total Phosphorous as P	Sulphate	Total Organic Carbon	Dissolved Organic Carbon
		pH	mg/L	µS/cm	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																							
CSR Aquatic Life (AW)[a]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,700-18,500[b]	n/a	1,500	2,000-3,000[c]	400	0.2-1[d]	n/a	n/a	n/a	1,280-4,290[c]	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	100	10	n/a	n/a	n/a	1,000	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	10	1	n/a	n/a	n/a	500	n/a	n/a
Fording River Valley (Cont'd)																							
FR_09-04-A	2018 01 31	8.28	682	1,230	1.0	894	0.24	348	344	4.0	< 1.0	11.1	< 0.050	5.97	261	0.0921	< 0.0010	< 0.050	0.0038	0.0048	348	1.12	1.39
	2018 06 13	8.32	770	1,190	< 1.0	935	0.12	340	336	4.4	< 1.0	< 5.0	< 0.25	8.0	360	0.089	0.0060	< 0.050	0.0032	0.0032	396	0.82	0.81
	2018 08 01	8.13	705	1,150	< 1.0	967	0.21	363	363	< 1.0	< 1.0	< 5.0	< 0.25	7.9	350	0.295	< 0.0050	0.100	0.0047	0.0040	386	0.83	0.88
	Duplicate	8.12	756	1,140	< 1.0	939	0.15	369	369	< 1.0	< 1.0	9.6	< 0.25	7.8	350	0.202	0.0050	0.239	0.0044	0.0064	406	1.76	1.19
	QA/QC RPD%	< 1	7	1	*	3	*	2	2	*	*	*	*	1	0	37	*	*	*	*	5	*	*
	2018 12 12	8.13	637	1,150	4.9	899	0.81	358	358	< 1.0	< 1.0	25.9	< 0.25	6.6	330	0.286	0.0093	< 0.050	0.0189	0.0035	352	< 0.50	0.54
FR_09-04-B	2018 01 31	8.21	683	1,220	< 1.0	840	0.16	351	351	< 1.0	< 1.0	11.0	< 0.050	6.00	247	0.0774	< 0.0010	< 0.050	0.0037	0.0043	350	0.97	1.08
	Duplicate	8.18	694	1,210	< 1.0	869	0.20	345	345	< 1.0	< 1.0	10.3	< 0.050	6.02	297	0.0776	< 0.0010	< 0.050	0.0036	0.0033	349	1.28	1.27
	QA/QC RPD%	< 1	2	1	*	3	*	2	2	*	*	*	*	< 1	18	< 1	*	*	*	*	0	*	*
	2018 06 13	8.11	712	1,150	4.1	932	1.41	295	295	< 1.0	< 1.0	< 5.0	< 0.25	8.2	350	0.664	0.0059	0.072	0.0027	0.0076	392	0.80	0.88
	2018 08 01	8.06	746	1,150	< 1.0	959	0.20	362	362	< 1.0	< 1.0	< 5.0	< 0.25	8.4	410	0.915	< 0.0050	0.103	0.0040	0.0032	418	0.60	0.62
	2018 12 12	8.16	694	1,160	< 1.0	893	0.57	358	358	< 1.0	< 1.0	16.5	< 0.25	6.8	320	0.266	0.0698	< 0.050	0.0147	< 0.0020	353	0.55	0.55
FR_TT43	2018 06 14	8.16	661	1,090	1.9	829	0.33	279	279	< 1.0	< 1.0	< 5.0	< 0.050	< 0.50	162	26.8	0.0016	0.40	< 0.0010	0.0061	219	< 0.50	< 0.50
	2018 08 02	8.07	696	944	14.1	903	10.7	173	173	< 1.0	< 1.0	10.7	< 0.25	< 2.5	150	35.4	< 0.005	< 0.050	0.0021	0.0123	271	0.73	0.76
	2018 12 18	7.94	1,380	2,030	< 1.0	1,710	0.43	369	369	< 1.0	< 1.0	< 5.0	< 0.25	< 2.5	200	78.7	< 0.005	< 0.050	0.0138	0.0022	619	0.61	0.62
FR_09-02-A	2018 02 22	7.87	506	989	13.6	733	29.1	276	276	< 1.0	< 1.0	< 5.0	< 0.050	1.77	140	15.7	< 0.0010	0.356	0.0016	0.0328	287	1.07	0.77
	2018 06 13	8.12	633	1,030	1.2	812	0.42	228	228	< 1.0	< 1.0	< 5.0	< 0.25	< 2.5	210	31.0	0.0082	< 0.10	0.0025	0.0037	247	0.74	0.82
	Duplicate	8.10	634	1,020	< 1.0	778	0.38	226	226	< 1.0	< 1.0	< 5.0	< 0.25	2.6	230	30.7	0.0061	< 0.10	0.0029	0.0039	250	0.90	0.95
	QA/QC RPD%	< 1	< 1	1	*	4	*	1	1	*	*	*	*	*	9	1	29	*	*	*	1	*	*
	2018 07 31	8.26	361	679	1.7	502	1.37	192	192	< 1.0	< 1.0	5.5	< 0.050	1.14	189	9.87	0.0032	< 0.050	0.0041	0.0043	169	1.06	0.97
	2018 12 13	8.12	528	909	32.4	714	14.6	197	197	< 1.0	< 1.0	27.2	< 0.050	1.77	214	15.5	< 0.0010	0.588	0.0091	0.0510	288	0.90	0.83
FR_09-02-B	2018 02 08	8.06	556	981	< 1.0	729	0.46	205	205	< 1.0	< 1.0	12.1	< 0.050	2.13	130	12.7	< 0.0010	0.364	0.0030	0.0029	270	0.72	0.74
	2018 06 13	8.29	616	995	1.0	748	0.25	224	224	< 1.0	< 1.0	< 5.0	< 0.25	< 2.5	200	31.0	0.0060	< 0.10	0.0012	0.0025	252	0.90	0.96
	2018 07 31	8.10	456	823	1.1	663	0.74	196	196	< 1.0	< 1.0	5.9	< 0.050	1.82	171	15.9	0.0018	< 0.050	0.0032	0.0019	223	1.11	1.15
	2018 12 13	8.08	508	876	1.2	668	1.29	188	188	< 1.0	< 1.0	25.8	< 0.050	1.61	196	13.8	< 0.0010	0.179	0.0109	< 0.0020	274	0.92	0.93
FR_09-01-A	2018 06 13	8.27	633	1,050	1.6	808	0.20	268	268	< 1.0	< 1.0	14.5	< 0.25	< 2.5	240	31.6	0.0077	< 0.10	0.0020	0.0026	239	0.72	0.82
	2018 07 31	8.18	565	1,040	< 1.0	808	0.12	324	324	< 1.0	< 1.0	< 5.0	< 0.050	0.87	144	24.0	0.0038	< 0.050	0.0040	0.0027	226	0.53	2.34
	2018 12 13	7.89	560	956	< 1.0	729	0.11	235	235	< 1.0	< 1.0	62.0	< 0.050	3.09	164	11.5	< 0.0010	0.413	0.0128	0.253	297	0.71	0.70
FR_09-01-B	2018 02 22	7.81	716	1,330	1.0	984	1.05	410	410	< 1.0	< 1.0	8.5	< 0.050	4.08	133	17.0	< 0.0010	0.333	0.0013	0.0044	378	0.64	0.70
	Duplicate	7.77	698	1,290	1.0	955	0.97	418	418	< 1.0	< 1.0	7.9	< 0.050	4.08	127	17.0	< 0.0010	0.329	0.0015	0.0048	378	0.57	< 0.50
	QA/QC RPD%	1	3	3	*	3	8	2	2	*	*	*	*	0	5	0	*	1	*	*	0	*	*
	2018 06 13	8.25	550	952	< 1.0	715	0.19	217	217	< 1.0	< 1.0	6.1	< 0.25	< 2.5	210	29.3	0.0056	0.13	0.0012	0.0017	222	0.70	0.81
	2018 07 31	8.06	586	1,010	< 1.0	859	0.60	226	226	< 1.0	< 1.0	< 5.0	< 0.25	2.7	210	28.4	0.0090	< 0.050	0.0031	0.0013	311	1.15	0.79
	2018 12 13	7.94	471	845	< 1.0	648	0.49	192	192	< 1.0	< 1.0	20.5	< 0.050	1.85	216	12.8	< 0.0010	0.275	0.0097	< 0.0020	262	0.69	0.70
FR_GH_WELL4	2018 01 31	8.32	661	1,230	< 1.0	846	0.38	262	254	8.2	< 1.0	10.4	< 0.25	< 2.5	< 100	40.4	0.0080	0.224	0.0015	< 0.0010	269	0.96	1.33
	2018 06 14	8.41	567	968	< 1.0	724	0.23	254	248	6.6	< 1.0	31.2	< 0.050	1.31	138	22.4	0.0431	0.47	< 0.0010	< 0.0010	207	1.25	1.50
	2018 07 31	8.34	491	925	< 1.0	727	0.21	217	213	3.2	< 1.0	13.3	< 0.050	2.19	96	30.9	0.0320	< 0.050	0.0015	< 0.0010	207	0.80	1.22
	2018 12 13	7.98	669	1,090	4.8	838	8.44	266	266	< 1.0	< 1.0	28.1	< 0.050	2.02	114	31.6	0.0082	0.075	0.0117	< 0.0020	271	0.78	0.80

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QA/QC RPD Denotes quality assurance/quality control relative percent difference
* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with Hardness.
[d] Standard varies with Chloride.
[e] Standard varies with crop.
[f] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[h] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																													
		Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[h] µg/L
BC Standard																															
CSR Aquatic Life (AW)[a]		n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[c]	n/a	10[f]	40	20-90[c]	n/a	40-160[c]	n/a	n/a	n/a	0.25	10,000	250-1,500[c]	n/a	20	0.5-15[c]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[c]
CSR Irrigation Watering (IW)		5,000	n/a	100	n/a	100	n/a	500-6,000[e]	5	n/a	5[f]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	n/a
CSR Livestock Watering (LW)		5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[f]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)		9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[f]	20[g]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Fording River Valley (Cont'd)																															
FR_09-04-A	2018 01 31	< 3.0	< 0.10	< 0.10	93.7	< 0.020	< 0.050	28	0.986	139	< 0.10	1.14	< 0.50	< 10	< 0.050	96.2	81.6	*1,390*	< 0.0050	1.80	7.53	5.70	0.118	< 0.010	7.55	217	0.059	< 0.10	< 10	6.22	< 0.50	3.6
	2018 06 13	< 3.0	0.12	< 0.10	115	< 0.020	< 0.050	33	1.30	165	< 0.10	1.39	< 0.50	< 10	< 0.050	99.3	86.7	*1,420*	< 0.0050	1.98	8.55	6.58	0.177	< 0.010	7.79	247	0.070	< 0.10	< 10	6.88	< 0.50	4.5
	2018 08 01	< 3.0	0.12	< 0.10	98.1	< 0.020	< 0.050	31	1.12	152	< 0.10	1.33	< 0.50	< 10	< 0.050	89.0	78.9	*1,310*	< 0.0050	1.80	7.53	5.42	0.188	< 0.010	6.57	220	0.060	< 0.10	< 10	5.89	< 0.50	4.5
	Duplicate	< 3.0	0.13	< 0.10	106	< 0.020	< 0.050	34	1.23	158	< 0.10	1.41	< 0.50	< 10	< 0.050	95.8	87.6	*1,430*	< 0.0050	1.96	8.19	6.26	0.204	< 0.010	7.50	236	0.068	< 0.10	< 10	6.46	< 0.50	4.4
	QA/QC RPD%	*	*	*	8	*	*	*	9	4	*	6	*	*	*	7	10	9	*	9	8	14	*	*	13	7	13	*	*	9	*	*
	2018 12 12	< 3.0	< 0.10	0.11	95.6	< 0.020	< 0.050	30	1.04	134	< 0.10	1.17	< 0.50	< 10	< 0.050	79.1	73.6	*1,320*	< 0.0050	2.05	7.29	5.23	0.147	< 0.010	6.61	217	0.052	< 0.10	< 10	5.78	< 0.50	3.5
FR_09-04-B	2018 01 31	< 3.0	< 0.10	< 0.10	95.1	< 0.020	< 0.050	28	0.972	142	< 0.10	1.14	< 0.50	< 10	< 0.050	97.9	79.6	*1,340*	< 0.0050	1.71	7.85	5.54	0.185	< 0.010	7.54	220	0.066	< 0.10	< 10	5.83	< 0.50	4.6
	Duplicate	< 3.0	< 0.10	< 0.10	95.5	< 0.020	< 0.050	29	0.990	144	< 0.10	1.12	< 0.50	15	< 0.050	98.3	80.8	*1,370*	< 0.0050	1.68	7.71	5.60	0.232	< 0.010	7.47	223	0.060	< 0.10	< 10	5.61	< 0.50	3.6
	QA/QC RPD%	*	*	*	< 1	*	*	*	2	1	*	2	*	*	*	< 1	1	2	*	2	2	1	*	*	1	1	10	*	*	4	*	*
	2018 06 13	< 3.0	< 0.20	< 0.20	102	< 0.040	< 0.10	33	1.15	154	< 0.20	1.33	< 0.50	< 20	< 0.10	92.3	79.4	*1,290*	< 0.0050	1.64	8.0	5.70	0.13	< 0.020	7.24	227	0.066	< 0.20	< 10	6.03	< 1.0	4.1
	2018 08 01	< 3.0	0.11	< 0.10	101	< 0.020	< 0.050	31	1.14	161	< 0.10	1.30	< 0.50	< 10	< 0.050	90.5	83.5	*1,330*	< 0.0050	1.65	7.95	5.58	0.261	< 0.010	7.04	229	0.062	< 0.10	< 10	5.59	< 0.50	4.8
	2018 12 12	< 3.0	0.11	< 0.10	100	< 0.020	< 0.050	32	0.957	142	< 0.10	1.17	< 0.50	< 10	< 0.050	89.8	82.3	*1,340*	< 0.0050	1.86	7.71	5.50	0.218	< 0.010	7.08	220	0.061	< 0.10	< 10	5.80	< 0.50	3.5
FR_TT43	2018 06 14	18.2	0.35	< 0.10	56.8	< 0.020	< 0.050	28	0.0361	145	< 0.10	< 0.10	< 0.50	< 10	< 0.050	57.5	72.4	0.21	< 0.0050	0.986	0.59	3.64	***113***	< 0.010	2.40	142	< 0.010	< 0.10	< 10	4.25	< 0.50	1.9
	2018 08 02	15.9	0.43	< 0.10	59.0	< 0.020	< 0.050	24	0.0403	161	0.11	< 0.10	< 0.50	19	< 0.050	49.4	71.6	2.92	< 0.0050	1.08	0.63	3.59	***111***	< 0.010	2.11	156	< 0.010	< 0.10	< 10	5.87	< 0.50	2.3
	2018 12 18	< 3.0	0.41	0.10	85.5	< 0.020	< 0.050	22	0.0585	310	< 0.10	1.61	< 0.50	< 10	< 0.050	79.2	148	< 0.10	< 0.0050	1.70	1.20	4.17	***281***	< 0.010	3.99	270	< 0.010	< 0.10	< 10	*10.6*	< 0.50	1.8
FR_09-02-A	2018 02 22	< 3.0	0.13	< 0.10	145	< 0.020	< 0.050	< 10	0.0528	117	0.16	0.12	< 0.50	< 10	< 0.050	30.1	51.9	< 0.10	< 0.0050	0.990	0.52	1.81	***52.8***	< 0.010	2.63	188	< 0.010	< 0.10	< 10	2.87	< 0.50	< 3.0
	2018 06 13	< 3.0	0.22	< 0.10	167	< 0.020	< 0.050	12	0.0304	149	< 0.10	< 0.10	< 0.50	< 10	< 0.050	47.8	63.3	< 0.10	< 0.0050	1.71	< 0.50	2.47	***96.3***	< 0.010	2.63	204	< 0.010	< 0.10	< 10	4.57	< 0.50	< 1.0
	Duplicate	< 3.0	0.22	< 0.10	165	< 0.020	< 0.050	12	0.0279	149	< 0.10	< 0.10	< 0.50	< 10	< 0.050	47.3	63.5	< 0.10	< 0.0050	1.68	< 0.50	2.46	***96.3***	< 0.010	2.59	205	< 0.010	< 0.10	< 10	4.60	< 0.50	< 1.0
	QA/QC RPD%	*	*	*	1	*	*	*	9	0	*	*	*	*	*	1	< 1	*	*	2	*	< 1	0	*	2	< 1	*	*	*	1	*	*
	2018 07 31	< 3.0	0.19	< 0.10	104	< 0.020	< 0.050	13	0.0257	83.7	0.12	< 0.10	< 0.50	< 10	< 0.050	28.8	37.0	< 0.10	< 0.0050	1.19	< 0.50	2.07	***33***	< 0.010	1.73	115	< 0.010	< 0.10	< 10	2.46	< 0.50	< 1.0
	2018 12 13	< 3.0	0.14	< 0.10	109	< 0.020	< 0.050	< 10	0.0394	120	0.12	0.10	< 0.50	< 10	< 0.050	37.8	55.5	< 0.10	< 0.0050	1.56	< 0.50	1.60	***49.2***	< 0.010	2.20	165	< 0.010	< 0.10	< 10	3.42	< 0.50	< 1.0
FR_09-02-B	2018 02 08	< 3.0	< 0.10	< 0.10	184	< 0.020	< 0.050	11	0.0387	131	0.45	0.16	0.97	< 10	< 0.050	41.6	55.9	< 0.10	< 0.0050	0.742	0.85	2.26	***49.9***	< 0.010	2.91	181	< 0.010	< 0.10	< 10	2.48	< 0.50	< 3.0
	2018 06 13	< 3.0	0.13	< 0.10	181	< 0.020	< 0.050	10	0.0243	145	< 0.10	< 0.10	< 0.50	< 10	< 0.050	45.9	61.4	< 0.10	< 0.0050	0.888	< 0.50	2.46	***87.8***	< 0.010	2.81	212	< 0.010	< 0.10	< 10	3.43	< 0.50	< 1.0
	2018 07 31	< 3.0	< 0.10	< 0.10	139	< 0.020	< 0.050	< 10	0.0225	107	< 0.10	0.13	< 0.50	< 10	< 0.050	36.2	46.0	< 0.10	< 0.0050	0.815	< 0.50	2.02	***49***	< 0.010	2.48	159	< 0.010	< 0.10	< 10	2.98	< 0.50	< 1.0
	2018 12 13	< 3.0	< 0.10	< 0.10	138	< 0.020	< 0.050	< 10	0.0228	119	0.11	< 0.10	< 0.50	< 10	< 0.050	33.4	50.8	< 0.10	< 0.0050	0.916	< 0.50	2.05	***45***	< 0.010	2.13	179	< 0.010	< 0.10	< 10	2.65	< 0.50	< 1.0
FR_09-01-A	2018 06 13	< 3.0	0.33	< 0.10	79.3	< 0.020	< 0.050	16	0.0286	143	< 0.10	< 0.10	16.4	< 10	< 0.050	47.9	67.1	< 0.10	< 0.0050	1.86	2.51	3.45	***106***	< 0.010	2.61	140	< 0.010	< 0.10	< 10	5.90	< 0.50	3.8
	2018 07 31	3.7	0.28	< 0.10	66.1	< 0.020	< 0.050	18	0.0251	125	0.27	< 0.10	4.90	< 10	< 0.050	47.1	61.2	< 0.10	< 0.0050	1.17	< 0.50	2.81	***81.2***	< 0.010	2.64	129	< 0.010	< 0.10	< 10	4.44	< 0.50	< 1.0
	2018 12 13	< 3.0	0.20	< 0.10	67.5	< 0.020	< 0.050	14	0.0525	131	0.14	0.44	< 0.50	< 10	< 0.050	41.5	56.3	< 0.10	< 0.0050	0.664	1.21	2.82	***38.1***	< 0.010	2.67	150	< 0.010	< 0.10	< 10	3.27	< 0.50	< 1.0
FR_09-01-B	2018 02 22	< 3.0	0.12	< 0.10	134	< 0.020	< 0.050	23	0.0414	159	0.16	0.47	< 0.50	< 10	< 0.050	65.0	77.4	< 0.10	< 0.0050	0.645	1.69	3.59	***53.5***	< 0.010	5.02	189	< 0.010	< 0.10	< 10	4.79	< 0.50	< 3.0
	Duplicate	< 3.0	0.12	< 0.10	137	< 0.020	< 0.050	21	0.0404	152	0.11	0.48	< 0.50	< 10	< 0.050	60.8	77.2	< 0.10	< 0.0050	0.675	1.71	3.64	***54.1***	< 0.010	5.11	194	< 0.010	< 0.10	< 10	4.89	< 0.50	< 3.0
	QA/QC RPD%	*	*	*	2	*	*	*	2	5	*	*	*	*	*	7	< 1	*	*	5	*	1	1	*	2	3	*	*	*	2	*	*
	2018 06 13	< 3.0	0.12	< 0.10	103	< 0.020	< 0.050	14	0.0177	125	< 0.10	< 0.10	< 0.50	< 10	< 0.050	44.6	57.9	< 0.10	< 0.0050	0.650	< 0.50	3.09	***97.1***	< 0.010	2.77	139	< 0.010	< 0.10	< 10	3.30	< 0.50	< 1.0
	2018 07 31	< 3.0	0.12	< 0.10	108	< 0.020	< 0.050	16	0.0278	130	0.13	0.12	< 0.50	< 10	< 0.050	50.9	63.2	< 0.10	< 0.0050	0.779	< 0.50	3.16	***79.4***	< 0.010	2.94	152	< 0.010	< 0.10	< 10	4.72	< 0.50	< 1.0
	2018 12 13	< 3.0	0.12	< 0.10	84.9	< 0.020	< 0.050	14	0.0289	110	0.11	0.18	< 0.50	< 10	< 0.050	37.6	48.0	< 0.10	< 0.0050	0.833	0.50	2.77	***41.8***	< 0.010	2.00	124	< 0.010	< 0.10	< 10	2.66	< 0.50	< 1.0
FR_GH_WELL4	2018 01 31	< 3.0	< 0.10	< 0.10	99.7	< 0.020	< 0.050	10	0.0468	157	< 0.10	< 0.10	1.59	14	0.079	23.4	65.4	1.42	< 0.0050	0.320	< 0.50	1.30	***109***	< 0.010	2.78	214	< 0.010	< 0.10	< 10	2.94	< 0.50	21.2
	2018 06 14	< 3.0	< 0.10	< 0.10	84.0	< 0.020	< 0.050	11	0.0382	134	< 0.10	< 0.10	2.04	24	0.058	26.0	56.4	2.77	< 0.0050	0.361	< 0.50	1.43	***77***	< 0.010	2.53	177	< 0.010	< 0.10	< 10	2.78	< 0.50	18.2
	2018 07 31	< 3.0	< 0.10	< 0.10	73.9	< 0.020	< 0.050	11	0.0342	117	< 0.10	< 0.10	2.22	11	0.430	22.7	48.2	0.70	< 0.0050	0.333	< 0.50	1.35	***76.9***	< 0.010	2.31	159	< 0.010	< 0.10	< 10	2.43	< 0.50	28.3
	2018 12 13	< 3.0	< 0.10	< 0.10	90.0	< 0.020	< 0.050	12	0.0388	163	< 0.10	0.10	2.20	28	0.100	28.9	63.3	2.25	< 0.0050	0.323	< 0.50	1.47	***99.2***	< 0.010	2.68	210	< 0.010	< 0.10	< 10	3.11	< 0.50	85.9

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* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with Hardness.
[d] Standard varies with Chloride.
[e] Standard varies with crop.
[f] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[h] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Physical Parameters							Dissolved Inorganics														Organics	
		Laboratory pH	Hardness	Laboratory Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Ammonia, Total (as N)	Bromide	Chloride	Fluoride	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Total Phosphorous as P	Sulphate	Total Organic Carbon	Dissolved Organic Carbon
		pH	mg/L	µS/cm	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																								
CSR Aquatic Life (AW)[a]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,700-18,500[b]	n/a	1,500	2,000-3,000[c]	400	0.2-1[d]	n/a	n/a	n/a	1,280-4,290[c]	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	100	10	n/a	n/a	n/a	1,000	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	10	1	n/a	n/a	n/a	500	n/a	n/a
Field Blanks																								
FR_POTWELLS	2018 02 20	5.52	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	7.7	< 0.050	< 0.50	< 20	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.30	< 0.50	< 0.50
FR_HMW2	2018 06 06	5.82	< 0.50	2.2	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	8.1	< 0.050	< 0.50	< 20	0.0050	< 0.0010	< 0.10	< 0.0010	< 0.0010	< 0.30	< 0.50	0.61
FR_HMW3	2018 07 18	4.91	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	6.7	< 0.050	< 0.50	< 20	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.30	< 0.50	< 0.50
FR_09-01-B	2018 12 13	5.68	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	616	< 0.050	< 0.50	< 20	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.30	< 0.50	< 0.50
Trip Blanks																								
FR_09-04-B	2018 01 31	5.49	-	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	8.5	< 0.050	< 0.50	< 20	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.30	< 0.50	-
FR_HMW3	2018 06 07	4.23	-	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	36.9	< 0.050	< 0.50	< 20	< 0.0050	< 0.0010	< 0.050	0.0011	< 0.0010	< 0.30	< 0.50	-
FR_HMW3	2018 07 18	4.84	-	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	6.2	< 0.050	< 0.50	< 20	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0010	< 0.30	< 0.50	-
FR_09-04-A	2018 12 12	5.74	-	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	83.4	< 0.050	< 0.50	< 20	< 0.0050	< 0.0010	< 0.050	0.0012	< 0.0020	< 0.30	< 0.50	-

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BOLD	Concentration greater than CSR Aquatic Life (AW) standard
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SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																													
		Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[h] µg/L
BC Standard																															
CSR Aquatic Life (AW)[a]		n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[c]	n/a	10[f]	40	20-90[c]	n/a	40-160[c]	n/a	n/a	n/a	0.25	10,000	250-1,500[c]	n/a	20	0.5-15[c]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[c]
CSR Irrigation Watering (IW)		5,000	n/a	100	n/a	100	n/a	500-6,000[e]	5	n/a	5[f]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	n/a
CSR Livestock Watering (LW)		5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[f]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)		9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[f]	20[g]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Field Blanks																															
FR_POTWELLS	2018 02 20	< 3.0	< 0.10	< 0.10	< 0.050	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
FR_HMW2	2018 06 06	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
FR_HMW3	2018 07 18	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
FR_09-01-B	2018 12 13	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
Trip Blanks																															
FR_09-04-B	2018 01 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_HMW3	2018 06 07	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
FR_HMW3	2018 07 18	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
FR_09-04-A	2018 12 12	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-

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< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference
* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with Hardness.
[d] Standard varies with Chloride.
[e] Standard varies with crop.
[f] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[h] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 5: Groundwater Analytical Results compared to Secondary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Selenium µg/L
Groundwater Quality Criteria		
Guideline for Canadian Drinking Water Quality (DW)		50
Site Performance Objective: GH_FR1 (0200378)		63
Compliance Point: FR_FRCP1 (E300071)		130
Henretta Valley		
FR_HMW1D	2018 01 24	**118**
	2018 07 18	13.7
	2018 12 11	**61.7**
FR_HMW1S	2018 01 25	**203**
	2018 06 12	**262**
	2018 07 18	**255**
	2018 12 11	**238**
FR_HMW2	2018 01 30	**650**
	2018 06 06	**891**
	2018 08 01	**705**
	2018 12 17	**725**
FR_HMW3	2018 01 25	**61.2**
	2018 06 07	**73.5**
	2018 07 18	**62.9**
	2018 12 11	**62.9**
Fording River Valley		
FR_POTWELLS	2018 02 20	31.6
	2018 06 12	10.5
	2018 08 02	11.8
	2018 12 27	24.6
FR_MW-1B	2018 02 14	**57**
	2018 06 13	20.6
	2018 08 01	24
	2018 12 19	47.6
FR_TT43	2018 06 14	**113**
	2018 08 02	**111**
	2018 12 18	**281**
FR_09-02-A	2018 02 22	**52.8**
	2018 06 13	**96.3**
	2018 07 31	33
	2018 12 13	49.2
FR_09-02-B	2018 02 08	49.9
	2018 06 13	**87.8**
	2018 07 31	49
	2018 12 13	45
FR_09-01-A	2018 06 13	**106**
	2018 07 31	**81.2**
	2018 12 13	38.1
FR_09-01-B	2018 02 22	**53.5**
	2018 06 13	**97.1**
	2018 07 31	**79.4**
	2018 12 13	41.8
FR_GH_WELL4	2018 01 31	**109**
	2018 06 14	**77**
	2018 07 31	**76.9**
	2018 12 13	**99.2**

Associated data provided by Teck Coal.
All terms defined within the body of SNC-Lavalin's report.

BOLD	Concentration greater than Canadian Drinking Water Quality guideline
UNDERLINE	Concentration greater than applicable Site Performance Objective
SHADED	Concentration greater than applicable Compliance Point

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Appendix II-2: Greenhills Operations 2018 Site-Specific Groundwater Monitoring Program

Summary

SNC-Lavalin completed the 2018 Annual Report for the GHO SSGMP (SNC-Lavalin, 2019b). The following information was taken from the 2018 GHO Annual Report.

The two main hydrogeological settings in surficial materials are in the upland areas and the Elk River and Fording River valley bottoms.

The GHO SSGMP includes a total of 11 monitoring wells which are monitored and sampled quarterly for a specific list of analytes. The wells monitored and sampled as part of the 2018 annual program are shown on Drawing 662793-002, attached. A summary of wells included in each drainage area is provided in Table 1; manual water level measurements provided in Table 2; field parameters in Table 3; and analytical results compared to screening criteria in Tables 4 and 5. Analytical results for select constituents of interest (CI), including nitrate-nitrogen, sulphate and dissolved selenium, are shown on Drawings 662793-007 to -009, attached.

A summary of the 2018 Annual Report for the GHO SSGMP is as follows:

- In 2018, quarterly groundwater monitoring and sampling events were completed at each of the eleven wells. Samples from the site-specific program were submitted for all parameters on the SSGMP analyte list, with the exception of turbidity, TDS, and TSS at GH_MW-PC as insufficient sample volume was avaliable for analysis.
- The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report. With the exception of three RPD values greater than 50%, the remaining RPD values were less than 50%. The laboratory quality control reports were reviewed and the data were considered reliable. Detectable concentrations of select parameters in field blanks were, for the most part, marginally above the DL or well below applicable primary screening criteria and did not affect the reliability of the data.
- Review of continuous groundwater elevation data indicated groundwater elevations follow a seasonal trend with higher groundwater levels recorded in spring months, except at GH_GA-MW-1, GH_MW-RLP-1D, and GH_MW-TD. Monitoring well GH_GA-MW-1 is located in the Elk River Valley bottom, but installed in low permeability material, where groundwater levels were relatively consistent year-round, except after sampling. Monitoring well GH_MW-RLP-1D is locatd in the Fording River Valley bottom at a depth of 82.5 m and is interpreted to be hydraulically isolated from shallow groundwater and surface water systems. Artesian conditions have historically been identified at GH_MW-TD. Downward vertical hydraulic gradients have been calculated at nested well pairs in the Elk River Valley (GH_MW-UTC-1S/D) and the Fording River Valley (GH_MW-GHC-1S/D).

Groundwater quality was similar to previous years, with notable conclusions listed below by drainage.

Elk River Valley

- Groundwater quality results from the Elk River Valley in 2018 were above the primary and secondary screening criteria for dissolved selenium at GH_GA-MW-2 in Q1 (Wolfram Creek) and GH_GA-MW-3 in Q2 (Thompson Creek). A concentration of nitrate nitrogen above the primary screening criteria was also measured in Q1 at monitoring well GH_GA-MW-2. Concentrations of CI in tributary surface water from Wolfram and Thompson Creeks have historically been greater than concentrations in groundwater, suggesting that surface water is the primary pathway for transport of CI to the Elk River valley bottom.
- Groundwater samples from GH_MW-UTC-1S/D, GH_GA-MW-1, and GH_GA-MW-4 were below the primary screening criteria for selenium. Based on low selenium concentrations in groundwater, groundwater transport of CI in these areas was inferred to be minimal.
- Groundwater at GH_GA-MW-4 had lower concentrations of CI and demonstrated reduced mine influence in 2018 compared to previous years, particularly pre-2016. This is interpreted to be due to an increased influence of infiltration from the Elk River, whereas it has historically exhibited relatively a similar major ion distribution to surface water from Leask Creek (sulphate-rich). As of 2017, the major ion distribution in groundwater shifted to a predominantly bicarbonate-rich water type, consistent with the Elk River, and concentrations of CI have decreased. In 2018, CI concentrations and mine-influence in groundwater at this location appears to be variable due to variable mixing of infiltrating surface water from Leask Creek as well as from the Elk River.
- In 2018, increasing concentrations of CI at in deep groundwater GH_GA-MW-2 (near Wolfram Creek) are indicative that infiltration of mine-influenced surface water from Wolfram Creek to the valley bottom is increasingly affecting groundwater quality. Over time, groundwater at this location has become more sulphate-rich supporting this interpretation. Shallow groundwater also appears to be affected, as downstream of GH_GA-MW-2, within the Elk River side channel, elevated concentrations of CI relative to primary screening criteria were measured.
- Groundwater at GH_GA-MW-3 (near Thompson Creek) appears to be influenced by a combination of the Elk River side channel and mine-influenced Thompson Creek. As times of peak flows, the groundwater chemistry at GH_GA-MW-3 appears to be influenced by infiltration of surface water from Thompson Creek, as evidenced by seasonal fluctuations in groundwater elevation, consistent with snow melt, and elevated concentrations of CI relative to the primary screening criteria. However, at times of low flow in Thompson Creek, although concentrations of CI remain elevated relative to nearby wells, the water type shifts from predominantly sulphate-rich to bicarbonate-rich and the mine-influence on groundwater at this location appears to be less.
- Parameters other than CI that were measured above primary screening criteria included: sodium, fluoride, boron, copper, lithium, manganese, molybdenum, strontium, and zinc. Dissolved lithium concentrations are considered naturally high in the Elk Valley and are not considered a concern. The remaining parameters above primary screening criteria were assessed in the 2017 RGMP and appeared to originate from natural sources (e.g., interaction with bedrock or unconsolidated materials) with the exception of zinc at GH_MW-UTC-1D and copper at GH_GA-MW-1. Zinc at GH_MW-UTC-1D is interpreted to be locally sourced and the source of copper at GH_GA-MW-1 is related to corrosion of copper fittings in the well; however, both of these parameters are not interpreted to be considered concerns at this time.

Fording River Valley

Porter Creek

› Concentrations of dissolved selenium above the primary and secondary screening criteria were measured at GH_MW-PC in 2018. Dissolved selenium and sulphate in tributary surface water from Porter Creek are of the same order-of-magnitude as concentrations measured in groundwater, indicating that surface water is expected to be the main transport pathway for loading of mine-influenced constituents to infiltrate the groundwater. Attenuation of selenium is not expected in the Porter Creek drainage, based on oxic to suboxic conditions and the connectivity of groundwater to surface water.

Greenhills Creek

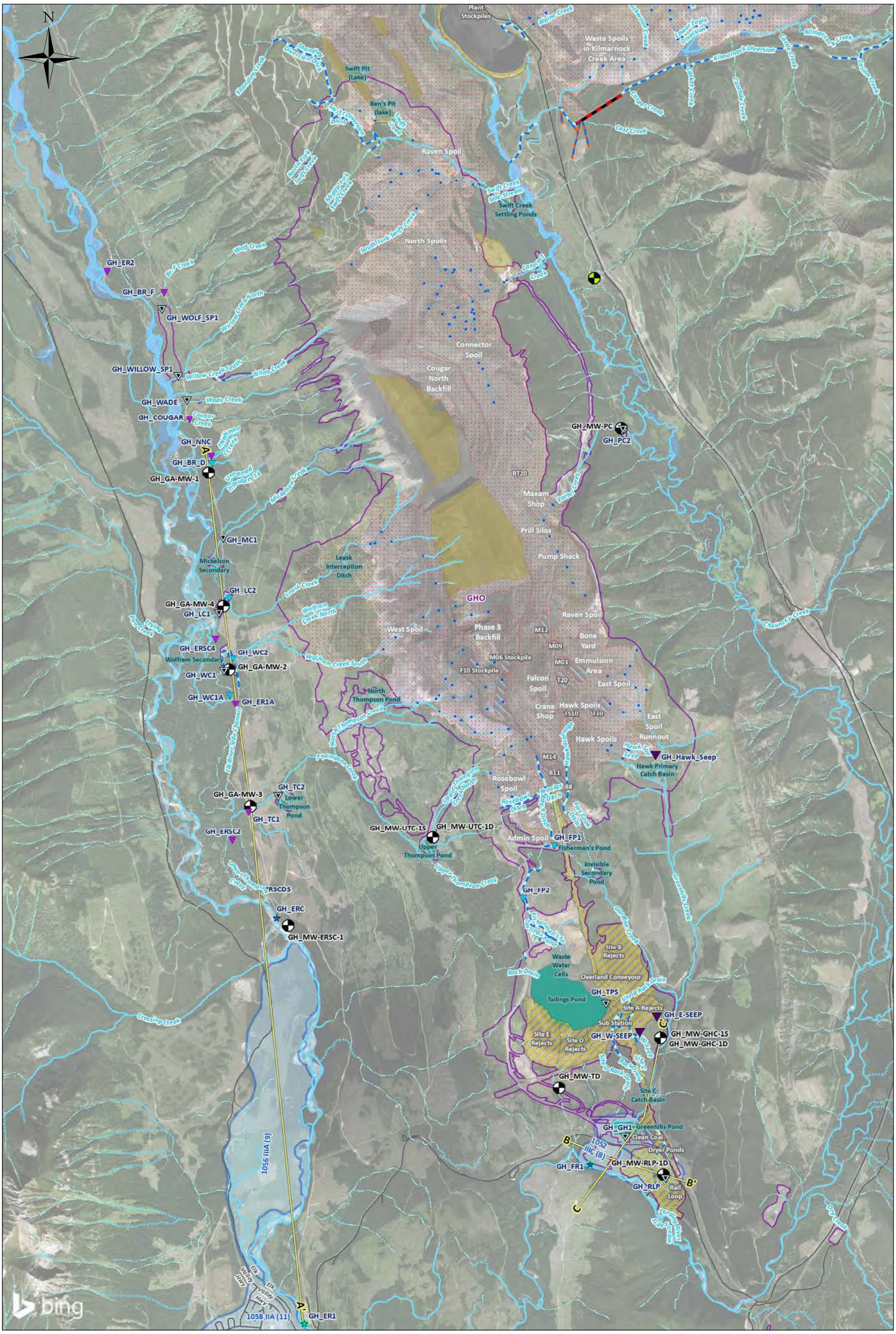
› Dissolved selenium concentrations in wells installed in the Greenhills Creek area were below the primary screening criteria in 2018. Concentrations of dissolved selenium in surface water from the Fording River (GH_FR1) and Greenhills Creek (GH_GH1) are approximately one to three orders-of-magnitude higher than groundwater. However, sulphate concentrations at the nested well pair exhibited similar seasonal fluctuations to surface water from Greenhills Creek. Sulphate at GH_MW-GHC-1S/D may be sourced from infiltration of Greenhills Creek over the alluvial fan. As reducing conditions in groundwater exist at this location, as well as sulphate concentrations greater than 30 mg/L, low selenium concentrations may be attributed to preferential attenuation in the aquifer.
› Low dissolved selenium and sulphate concentrations measured in groundwater from GH_MW-RLP-1D suggests little influence from Fording River surface water. In addition, low concentrations of dissolved selenium in deep well GH_MW-TD (located beneath the TSF) suggest the absence of a deep groundwater pathway and interaction with surface water at this location. This is consistent with the interpretation that relatively continuous aquitard exists in the Fording River Valley in the Greenhills Creek Monitoring Area. Year-round low concentrations of selenium in groundwater at GH_MW-TD (near the TSF and CCR) may be related to preferential attenuation of selenium relative to sulphate. Attenuation of nitrate and selenium near Greenhills Creek is currently being assessed as part of the instream sinks program at GHO.
› Parameters other than Cl were measured above primary screening criteria included: fluoride, chromium, copper, lithium, and manganese. Dissolved lithium concentrations are considered naturally high across the Elk Valley and not a concern. The remaining parameters above primary screening criteria appear to originate from natural sources (e.g., interaction with bedrock or unconsolidated materials) with the exception of chromium and copper at GH_MW-PC. The increase in chromium and copper concentrations are either anomalous or locally-sourced; this can be confirmed by continued sampling.

Recommendations

SNC-Lavalin has the following recommendations for future groundwater monitoring and sampling:

› Once approved, implement the 2018 SSGMP Update;
› Complete hydraulic conductivity testing at monitoring wells which have not been previously tested (GH_MW-RLP-1D and GH_MW-TD);

- For nested wells, monitor wells on the same day, one right after the other, and collect manual depth to groundwater measurements prior to purging either well rather than purging and sampling one well and then moving to the well pair;
- Implement the new data logger deployment procedures to ensure that continuous water level measurements are properly obtained from select monitoring wells;
- Field filter and preserve groundwater samples for analysis of dissolved metals and DOC;
- Use trip blanks and analyze for parameters listed in the 2014 SSGMP and the 2018 SSGMP Update once approved;
- Ensure groundwater samples are packed in coolers in such a way to minimize sample loss during transport;
- Continue discussions with the laboratory on the best procedures to minimize hold-time exceedances;
- Complete a QA/QC on laboratory results as they come in to identify hold-time and other errors that may arise to rectify in the subsequent sampling event; and
- As recommended in the 2018 SSGMP Update (SNC-Lavalin, 2018a), attempt to re-develop monitoring well GH_MW-PC. High field turbidity has been measured in this well in addition to variable field parameters readings. If Teck suspects the integrity of the monitoring well may be compromised, the well should be decommissioned according to the GWPR and re-installed in a suitable location.



Legend

Surface Water Stations
- Seep
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Groundwater Stations
- Monitoring Well
- Supply Well

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Water Pipeline
- Mapped Aquifers

Site Features
- Geological Cross Sections
- GHO Permitted Boundary
- Tailings/Settling Pond
- River Bed
- Pit
- Plant Site
- Stockpiles
- Waste Dump (Spoils)
- Secondary Road

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Information provided by Teck Coal Ltd.
2. Mapped Aquifers are from Water Resources Atlas (BC ENV)

Revisons:
0 - AO - 2019-01-24 - DRAFT - KC

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Greenhills Operations, BC

CLIENT NAME: Teck Coal Ltd.

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Site Features and Sample Location Plan

CHK'D: KC | DATE: 2019/02/25 | SCALE: 1:45,000 | Ref Num: | REV: 0
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 662793-002

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\662793_GHO_SSGMP\662793_002_SampLocPlan_GHO.mxd

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Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_MW-PC	2018 03 28	[61.3]
	2018 06 19	[84] SPO
	2018 08 20	[65.7] SPO
	2018 12 12	[70.3] SPO

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_GA-MW-1	2018 03 13	0.093
	2018 05 17	0.11
	2018 08 27	0.095
	2018 11 21	0.208

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_GA-MW-4	2018 03 21	2.23
	2018 05 17	4.95
	2018 08 27	2.51
	2018 11 21	2.61

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_GA-MW-2	2018 03 21	43.1
	2018 05 17	8.78
	2018 09 12	13.5
	2018 11 26	11.3

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_MW-UTC-1S	2018 03 22	1.51
	2018 06 13	1.72
	2018 08 22	2.32
	2018 11 29	2.06

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_MW-UTC-1D	2018 03 08	0.4
	2018 06 13	0.69
	2018 08 22	0.54
	2018 11 28	1.29

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_GA-MW-3	2018 03 07	< 0.10
	2018 05 16	49.2
	2018 09 12	3.38
	2018 11 26	10.3

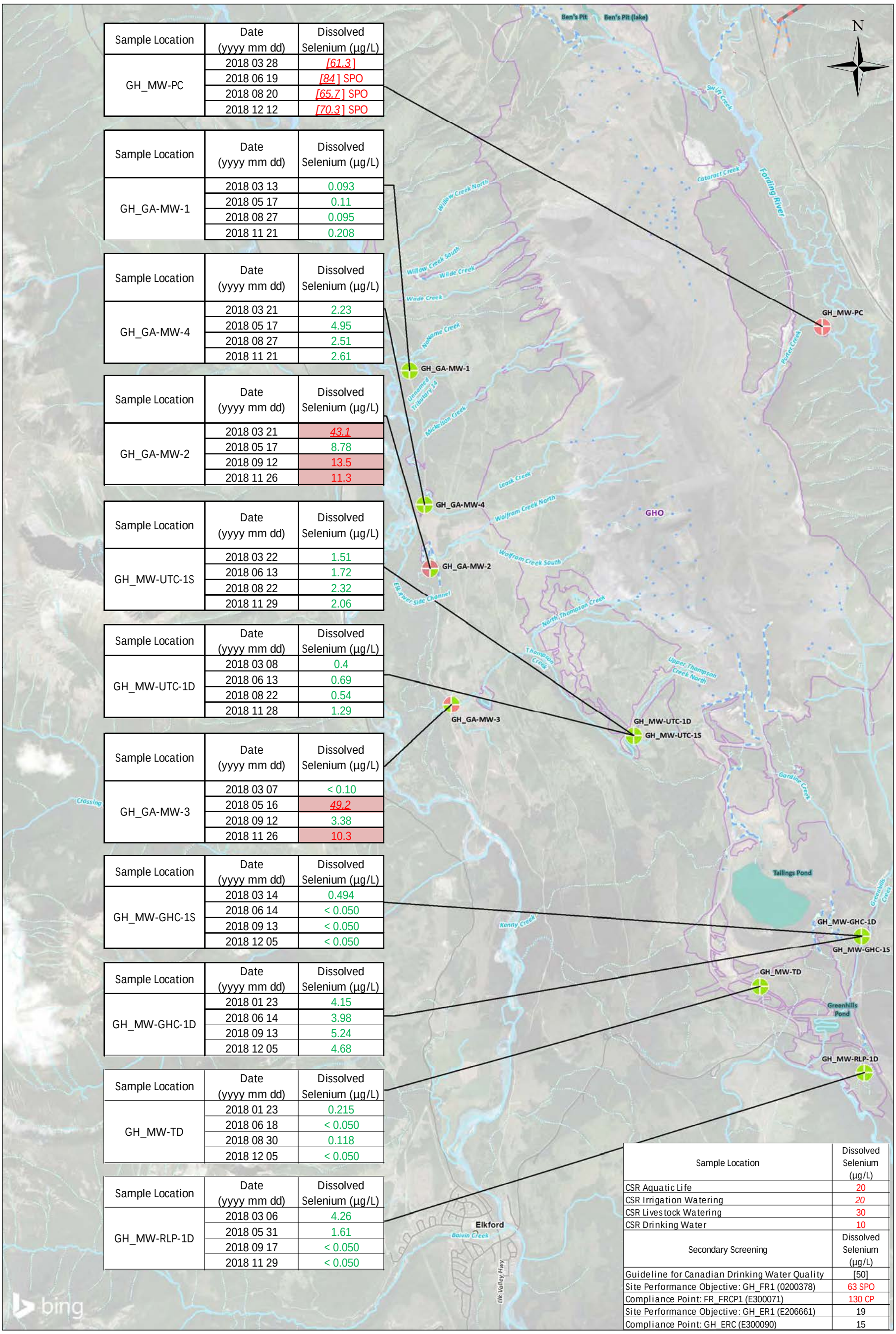
Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_MW-GHC-1S	2018 03 14	0.494
	2018 06 14	< 0.050
	2018 09 13	< 0.050
	2018 12 05	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_MW-GHC-1D	2018 01 23	4.15
	2018 06 14	3.98
	2018 09 13	5.24
	2018 12 05	4.68

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_MW-TD	2018 01 23	0.215
	2018 06 18	< 0.050
	2018 08 30	0.118
	2018 12 05	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
GH_MW-RLP-1D	2018 03 06	4.26
	2018 05 31	1.61
	2018 09 17	< 0.050
	2018 11 29	< 0.050

Sample Location	Dissolved Selenium (µg/L)
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10
Secondary Screening	Dissolved Selenium (µg/L)
Guideline for Canadian Drinking Water Quality	[50]
Site Performance Objective: GH_FR1 (0200378)	63 SPO
Compliance Point: FR_FRCP1 (E300071)	130 CP
Site Performance Objective: GH_ER1 (E206661)	19
Compliance Point: GH_ERC (E300090)	15



Legend

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Water Pipeline
- Secondary Road

Site Features
- GHO Permitted Boundary
- River Bed
- Tailings/Settling Pond
- River Bed

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
1. Intended for Illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Information provided by Teck Coal Ltd.

Revisons:
0 - AO - 2019-01-24 - DRAFT - KC

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Greenhills Operations, BC

CLIENT NAME: Teck Coal Ltd.

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Spatial Distribution of Dissolved Selenium in Groundwater

CHK'D: KC | DATE: 2019/02/26 | SCALE: 1:45,000 | Ref Num: | REV: 0
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 662793-007

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Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_MW-PC	2018 03 28	1.94
	2018 06 19	2.49
	2018 08 20	1.56
	2018 12 12	2.14

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_GA-MW-1	2018 03 13	0.384
	2018 05 17	0.64
	2018 08 27	0.118
	2018 11 21	1.49

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_GA-MW-4	2018 03 21	0.523
	2018 05 17	1.74
	2018 08 27	0.848
	2018 11 21	0.838

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_GA-MW-2	2018 03 21	16.1
	2018 05 17	3.7
	2018 09 12	5.68
	2018 11 26	4.8

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_MW-UTC-1S	2018 03 22	0.0189
	2018 06 13	< 0.40
	2018 08 22	0.0746
	2018 11 29	0.0474

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_MW-UTC-1D	2018 03 08	1.24
	2018 06 13	0.51
	2018 08 22	< 0.0050
	2018 11 28	< 0.025

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_GA-MW-3	2018 03 07	< 0.0050
	2018 05 16	3.48
	2018 09 12	0.0087
	2018 11 26	0.0052

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_MW-GHC-1S	2018 03 14	< 0.0050
	2018 06 14	< 0.40
	2018 09 13	0.056
	2018 12 05	< 0.025

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_MW-GHC-1D	2018 01 23	0.108
	2018 06 14	< 0.40
	2018 09 13	0.221
	2018 12 05	0.111

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_MW-TD	2018 01 23	< 0.025
	2018 06 18	< 0.0050
	2018 08 30	< 0.025
	2018 12 05	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
GH_MW-RLP-1D	2018 03 06	< 0.0050
	2018 05 31	< 0.005
	2018 09 17	< 0.0050
	2018 11 29	< 0.0050

Sample Location	Nitrate Nitrogen (mg/L)
CSR Aquatic Life	400
CSR Irrigation Watering	*n/a*
CSR Livestock Watering	100
CSR Drinking Water	10

Ben's Pit
Ben's Pit (lake)
Swift Creek
Cataract Creek
Fording River
Willow Creek North
Willow Creek South
Wilde Creek
Wade Creek
NoName Creek
Porter Creek
Unnamed Tributary 14
Mickelson Creek
Leask Creek
Wolfram Creek North
Wolfram Creek South
GHO
Elk River Side Channel
North Thompson Creek
Thompson Creek
Upper Thompson Creek North
Gordine Creek
Crossing Creek
Tailings Pond
Greenhills Creek
Kenny Creek
Greenhills Pond
Elkford
Bolvin Creek
Elk Valley Hwy
GH_MW-PC
GH_GA-MW-1
GH_GA-MW-4
GH_GA-MW-2
GH_GA-MW-3
GH_MW-UTC-1D
GH_MW-UTC-1S
GH_MW-GHC-1D
GH_MW-GHC-1S
GH_MW-TD
GH_MW-RLP-1D
N
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Legend

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Water Pipeline
- Secondary Road

Site Features
- GHO Permitted Boundary
- River Bed
- Tailings/Settling Pond
- River Bed

Q4 | Q1
Q3 | Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
1. Intended for Illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Information provided by Teck Coal Ltd.

Revisons:
0 - AO - 2019-01-24 - DRAFT - KC

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Greenhills Operations, BC

CLIENT NAME: Teck Coal Ltd.

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Spatial Distribution of Dissolved Nitrate Nitrogen in Groundwater

CHK'D: KC | DATE: 2019/02/26 | SCALE: 1:45,000 | Ref Num: | REV: 0
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 662793-008

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Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_MW-PC	2018 03 28	417
	2018 06 19	481
	2018 08 20	423
	2018 12 12	430

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_GA-MW-1	2018 03 13	344
	2018 05 17	269
	2018 08 27	214
	2018 11 21	240

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_GA-MW-4	2018 03 21	45.7
	2018 05 17	61.6
	2018 08 27	36.7
	2018 11 21	37.1

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_GA-MW-2	2018 03 21	272
	2018 05 17	226
	2018 09 12	273
	2018 11 26	265

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_MW-UTC-1S	2018 03 22	34.2
	2018 06 13	29.8
	2018 08 22	28.5
	2018 11 29	33.3

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_MW-UTC-1D	2018 03 08	21
	2018 06 13	46.1
	2018 08 22	16.8
	2018 11 28	13.6

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_GA-MW-3	2018 03 07	27.4
	2018 05 16	387
	2018 09 12	45.8
	2018 11 26	30.9

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_MW-GHC-1S	2018 03 14	610
	2018 06 14	615
	2018 09 13	608
	2018 12 05	537

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_MW-GHC-1D	2018 01 23	300
	2018 06 14	322
	2018 09 13	334
	2018 12 05	279

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_MW-TD	2018 01 23	87.6
	2018 06 18	86.6
	2018 08 30	87.9
	2018 12 05	83.6

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
GH_MW-RLP-1D	2018 03 06	0.68
	2018 05 31	0.67
	2018 09 17	< 0.30
	2018 11 29	< 0.30

Sample Location	Sulphate (mg/L)
CSR Aquatic Life	1,280-4,290
CSR Irrigation Watering	*n/a*
CSR Livestock Watering	1000
CSR Drinking Water	500

Ben's Pit
Ben's Pit (lake)
Swift Creek
Cataract Creek
Fording River
Willow Creek North
Willow Creek South
Wilde Creek
Wade Creek
NoName Creek
Porter Creek
Unnamed Tributary 14
Mickelson Creek
Leask Creek
Wolfram Creek North
Wolfram Creek South
GHO
Elk River Side Channel
North Thompson Creek
Thompson Creek
Upper Thompson Creek North
Gardine Creek
Tailings Pond
Greenhills Creek
Kenny Creek
Greenhills Pond
Elkford
Boivin Creek
Elk Valley Hwy
GH_MW-PC
GH_GA-MW-1
GH_GA-MW-4
GH_GA-MW-2
GH_GA-MW-3
GH_MW-UTC-1D
GH_MW-UTC-1S
GH_MW-GHC-1D
GH_MW-GHC-1S
GH_MW-TD
GH_MW-RLP-1D
N
bing

Legend

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Water Pipeline
- Secondary Road

Site Features
- GHO Permitted Boundary
- River Bed
- Tailings/Settling Pond
- River Bed

Q4 | Q1
Q3 | Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
1. Intended for Illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Information provided by Teck Coal Ltd.

Revisons:
0 - AO - 2019-01-24 - DRAFT - KC

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION: Greenhills Operations, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Dissolved Sulphate in Groundwater

CHK'D: KC | DATE: 2019/02/26 | SCALE: 1:45,000 | Ref Num: | REV: 0
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 662793-009

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\662793_GHO_SSGMP\662793_009_SpatialDistConInGW_GHO_Sul.mxd

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GIS\Exports\662793_GHO_SSGMP

TABLE 1: Summary of Groundater Monitoring Program Locations

Area	Well ID	Monitoring Program	Coordinates (UTM NAD 83)		LIDAR Ground Elevation	Ground Elevation	TOC Elevation	Stick Up Height	Drilled Depth	Well Diameter	Top of Screen Depth	Bottom of Screen Depth	Screened Interval	Depth to Bedrock	Hydraulic Conductivity
			Easting	Northing	masl	masl	masl	m	mbgs	mm	mbgs	mbgs		mbgs	m/s
Elk River	GH_GA-MW-1	SSGMP, RGMP	648019	5554750	1378.81	1379.21	1380.26	1.05	22.6	-	15.50	18.50	Clayey Sand	22.6	1.0E-12
	GH_GA-MW-4	SSGMP, RGMP	648217	5552963	1311.57	1312.15	1313.05	0.90	17.2	-	13.70	16.70	Sand and Gravel	-	1.0E-04
	GH_GA-MW-2	SSGMP, RGMP	648291	5552115	1305.23	1306.66	1307.68	1.02	29.6	-	23.00	29.00	Sand/Silt	28.5	1.0E-03
	GH_GA-MW-3	SSGMP, RGMP	648578	5550296	1299.62	1299.78	1300.75	0.97	14.4	-	8.00	14.00	Sand and Gravel	14.4	2.0E-06
	GH_MW-UTC-1S	SSGMP	651011	5549879	1601.63	1602.00	1603.22	1.22[b]	7.6	51	4.50	7.50	Clay/Bedrock	5.5	1.0E-06
	GH_MW-UTC-1D	SSGMP	651011	5549879	1601.63	1602.00	1603.22	1.22[b]	50.0	51	40.00	43.00	Bedrock	7.0	2.4E-08
Fording River	GH_MW-PC	SSGMP, RGMP[a]	653526	5555339	1573.37	1583.50	1582.28	1.22	45.0	51	3.50	6.50	Gravel and Cobbles	5.5	6.3E-07
	GH_MW-GHC-1S	SSGMP	654050[c]	5547205[c]	1597.60	1610.00	1610.80	0.80	14.6	51	4.58	7.63	Silty Gravel	14.6	3.0E-07
	GH_MW-GHC-1D	SSGMP	654052[c]	5547207[c]	1597.04	1610.00	1610.80	0.80	23.2	51	18.30	21.40	Bedrock	14.6	5.0E-05
	GH_MW-TD	SSGMP	652694	5546536	1590.84	1600.00	1600.75	0.75	38.1	51	31.39	34.44	Sand and Silt	35.1	-
	GH_MW-RLP-1D	SSGMP, RGMP[a]	654088	5545381	1494.78	1495.00	-	-	83.5	51	79.50	82.50	Sand and Gravel	-	-

Notes: a) Proposed in the 2017 RGMP; b) Stick up not surveyed but reported estimate was 1.2 m; c) UTM coordinates obtained from LIDAR.

masl = metres above sea level
mbgs = metres below ground surface

TABLE 2: Summary of Groundwater Elevations and Calculated Vertical Gradients

Area	Well ID	LIDAR Ground Elevation	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Water Level Elevation	Well Pair	Date of Static Water Level Measurement	Calculated Vertical Gradient
		masl	masl	masl	m	yyyy/mm/dd	mtoc	masl		yyyy/mm/dd	m/m
Elk River	GH_GA-MW-1	1378.81	1379.21	1380.26	1.05	2018/03/13	15.47	1364.79			
						2018/05/17	17.04	1363.22			
						2018/08/27	16.92	1363.34			
						2018/11/21	17.08	1363.18			
	GH_GA-MW-4	1311.57	1312.15	1313.05	0.90	2018/03/21	6.81	1306.24			
						2018/05/17	3.87	1309.19			
						2018/08/27	6.24	1306.81			
						2018/11/21	6.95	1306.10			
	GH_GA-MW-2	1305.23	1306.66	1307.68	1.02	2018/03/21	4.83	1302.85			
						2018/05/17	3.34	1304.35			
						2018/09/12	5.55	1302.13			
						2018/11/26	6.00	1301.68			
	GH_GA-MW-3	1299.62	1299.78	1300.75	0.97	2018/03/07	8.86	1291.89			
						2018/05/16	3.24	1297.51			
						2018/09/12	8.82	1291.93			
						2018/11/26	9.10	1291.65			
	GH_MW-UTC-1S	1601.63	1602.00	1603.22	1.22[a]	2018/03/22	2.56	1600.66	GH_MW-UTC-1S and GH_MW-UTC-1D	-	-
						2018/06/13	2.55	1600.67		2018/06/13	-0.023
						2018/08/22	2.43	1600.79		2018/08/22	-0.034
						2018/11/29	2.74	1600.48		-	
	GH_MW-UTC-1D	1601.63	1602.00	1603.22	1.22[a]	2018/03/08	3.71	1599.51			
						2018/06/13	3.35	1599.87			
						2018/08/22	3.64	1599.58			
						2018/11/28	4.09	1599.13			
Fording River	GH_MW-PC	1573.37	1583.50	1582.28	1.22	2018/03/28	3.99	1578.29			
						2018/06/19	3.87	1578.41			
						2018/08/20	4.40	1577.88			
						2018/12/12	4.20	1578.08			
	GH_MW-GHC-1S	1597.60	1610.00	1610.80	0.80	2018/03/14	1.49	1609.31	GH_MW_GHC-1S and GH_MW_GHC_1D	-	-
						2018/06/14	1.15	1609.65		2018/06/14	-0.506
						2018/09/13	3.01	1607.79		2018/09/13	-0.426
						2018/12/05	3.17	1607.63		2018/12/05	-0.431
	GH_MW-GHC-1D	1597.04	1610.00	1610.80	0.80	2018/01/23	9.07	1601.73			
						2018/06/14	8.10	1602.70			
						2018/09/13	8.86	1601.94			
						2018/12/05	9.09	1601.71			
	GH_MW-TD	1590.84	1600.00	1600.75	0.75	2018/01/23	Artesian	> 1600.75			
						2018/06/18[b]	Artesian	> 1600.75			
						2018/08/30	Artesian	> 1600.75			
						2018/12/05	Artesian	> 1600.75			
	GH_MW-RLP-1D	1494.78	1495.00	1496.22	1.22[a]	2018/03/06	6.55	1489.67			
						2018/05/31	5.81	1490.41			
						2018/09/17	6.62	1489.60			
						2018/11/29	6.58	1489.64			

Notes: a) Stick up not surveyed but reported estimate was 4 ft; b) Assumed the date of static water level measurement was the same as the sample date

masl = metres above sea level
mtoc = metres below top of casing

TABLE 3: Field Measured Parameters

Sample Location	Sample Date (yyyy mm dd)	Field Parameters					
		pH	Temperature	Conductivity	ORP	Dissolved Oxygen	Turbidity
		pH	°C	µS/cm	mV	mg/L	NTU
Elk River							
GH_GA-MW-1	2018 03 13	7.67	6.1	1,167	129.4	3.82	4.31
	2018 05 17	7.46	7.2	1,158	181.3	2.53	4.1
	2018 08 27	7.49	7.3	1,043	192.7	4.02	1.53
	2018 11 21	7.51	2.5	1,112	241.6	1.34	4.91
GH_GA-MW-4	2018 03 21	7.59	4.7	380.1	233.1	6.56	0.27
	2018 05 17	7.58	7.1	450.8	219.8	6.82	2.4
	2018 08 27	7.65	9.3	375.9	239.9	4.80	1.06
	2018 11 21	7.88	6	370.7	200	4.79	0.56
GH_GA-MW-2	2018 03 21	7.28	4.6	894	246.4	1.31	4.93
	2018 05 17	7.39	6.4	797	219.7	0.75	10
	2018 09 12	7.45	6.5	806	243.2	0.38	2.5
	2018 11 26	7.47	4.2	829	239.3	1.02	1.42
GH_GA-MW-3	2018 03 07	7.54	4.8	538	-318.3	0.11	7.37
	2018 05 16	7.15	8.0	992	111.5	1.13	11.1
	2018 09 12	7.49	6.5	556	-306.9	0.22	12.1
	2018 11 26	7.56	4.5	551	-307.9	1.20	2.52
GH_MW-UTC-1S	2018 03 22	7.42	4.2	455.5	182	0.69	30.3
	2018 06 13	7.23	7.7	430.7	41.1	4.75	15.9
	2018 08 22	7.39	9.1	428.3	55.4	6.14	10.7
	2018 11 29	7.47	4.9	443.7	167.5	3.98	45.3
GH_MW-UTC-1D	2018 03 08	8.36	3.3	1,454	-102.1	0.22	40.1
	2018 06 13	8.20	8.0	1,472	-162.8	0.32	13.4
	2018 08 22	8.39	8.9	1,481	-74.5	0.63	7.40
	2018 11 28	8.43	5.3	1,463	-59.9	0.43	11.1
Fording River							
GH_MW-PC	2018 03 28	7.68	1.8	961	255.1	8.68	3.8
	2018 06 19	7.55	6.8	1,048	232.8	6.73	18.6
	2018 08 20	7.37	8.0	1,023	201.8	4.53	>35
	2018 12 12	7.70	2.8	1,030	242.0	8.12	90
GH_MW-GHC-1S	2018 03 14	6.99	3.8	1,321	87.2	0.32	4.7
	2018 06 14	6.87	5.8	1,264	-60.9	0.40	15.2
	2018 09 13	7.04	8.1	1,266	-13.6	0.92	4.10
	2018 12 05	7.15	5.5	1,272	-5.9	0.89	18.5
GH_MW-GHC-1D	2018 01 23	7.13	4.4	924	156.5	1.24	3.93
	2018 06 14	6.90	5.7	966	110.8	2.49	4.5
	2018 09 13	7.04	6.9	939	104.0	1.30	4.80
	2018 12 05	7.16	4.9	926	115.2	1.16	5.65
GH_MW-TD	2018 01 23	7.28	4.1	690	-73.3	4.87	0.82
	2018 06 18	7.56	8.2	674	142	3.15	1.8
	2018 08 30	7.52	9.5	700	51.5	3.38	2.78
	2018 12 05	7.37	4.3	668	-38.3	3.63	5.28
GH_MW-RLP-1D	2018 03 06	8.01	4.3	411.5	-197.0	3.0	5.09
	2018 05 31	8.20	7.9	365.1	-190.6	4.16	7.9
	2018 09 17	8.38	8.5	297.4	18.9	2.77	18.4
	2018 11 29	8.88	5.7	252.4	130.3	4.66	11.0

All terms defined within the body of SNC-Lavalin's report.

TABLE 4: Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Physical Parameters						Geochemical Indicators																				Organics	
			Conductivity	Hardness	pH	Total Dissolved Solids	Total Suspended Solids	Turbidity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Total Alkalinity	Cation Anion Balance	Bromide	Chloride	Fluoride	Sulphate	Dissolved Aluminum	Dissolved Calcium	Dissolved Iron	Dissolved Magnesium	Dissolved Manganese	Dissolved Potassium	Dissolved Sodium	Kjeldahl Nitrogen-N	Ammonia, Total (as N)	Nitrate Nitrogen	Nitrite Nitrogen	Total Phosphorous as P	Ortho-Phosphate	Dissolved Organic Carbon	Total Organic Carbon
			µS/cm	mg/L	pH	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	%	mg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																															
CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[c]	1,280-4,290[c]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,310-18,500[b]	400	0.2-2[d]	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	5,000	n/a	5,000	n/a	200	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	5,000	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	10	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	9,500	n/a	6,500	n/a	1,500	n/a	200	n/a	n/a	10	1	n/a	n/a	n/a	n/a
Elk River																															
GH_GA-MW-1	GH_GA-MW-1_WG_2018-01-01_NP	2018 03 13	1,360	315	8.23	837	13.9	8.38	384	< 1.0	< 1.0	384	-4.1	0.45	23.9	570	344	6.4	69.2	55	34.4	*301*	3.77	182	0.406	219	0.384	0.0114	0.0632	0.0202	5.24	5.54
	GH_GA-MW-1_WG_2018-04-01_NP	2018 05 17	1,220	346	8.42	825	10.9	8.01	348	19.0	< 1.0	367	3.2	0.442	18.6	682	269	< 3.0	72.2	34	40.2	*356*	4.09	170	0.894	290	0.640	0.0027	0.0513	0.0262	6.70	7.32
	GH_GA-MW-1_WG_2018-07-01_NP	2018 08 27	1,010	262	8.22	659	1.0	1.18	372	< 1.0	< 1.0	372	0.1	< 0.25	14.5	650	214	< 3.0	52.9	16	31.6	*217*	3.49	161	0.421	327	0.118	< 0.0050	0.0398	0.0401	3.28	2.92
	GH_GA-MW-1_WG_2018-10-01_NP	2018 11 21	1,150	306	8.22	688	2.8	3.05	346	< 1.0	< 1.0	346	2.9	< 0.25	15.3	630	240	< 3.0	64.1	24	35.5	*231*	3.30	161	0.428	243	1.49	< 0.0050	0.0479	0.0324	3.92	4.61
GH_GA-MW-4	GH_GA-MW-4_WG_2018-01-01_NP	2018 03 21	434	231	8.08	248	< 1.0	< 0.10	174	< 1.0	< 1.0	174	3.2	< 0.050	3.95	206	45.7	< 3.0	53.4	< 10	23.6	< 0.10	1.16	6.02	< 0.050	< 5.0	0.523	< 0.0010	< 0.0020	0.0014	0.87	0.72
	GH_GA-MW-4_WG_2018-04-01_NP	2018 05 17	465	258	8.36	267	< 1.0	< 0.10	183	8.4	< 1.0	191	0.8	< 0.050	3.47	206	61.6	< 3.0	60.8	< 10	25.7	< 0.10	1.05	5.58	0.110	< 5.0	1.74	< 0.0010	0.0023	0.0011	2.93	2.98
	GH_GA-MW-4_WG_2018-07-01_NP	2018 08 27	368	200	8.22	199	< 1.0	0.15	188	< 1.0	< 1.0	188	-4.4	< 0.050	2.36	197	36.7	< 3.0	44.6	< 10	21.6	0.15	1.17	5.27	< 0.050	15.4	0.848	< 0.0010	< 0.0020	0.0016	0.66	0.67
	GH_GA-MW-4_WG_2018-10-01_NP	2018 11 21	416	212	8.32	212	< 1.0	0.21	181	4.4	< 1.0	185	-1.6	< 0.050	3.93	203	37.1	< 3.0	50.6	< 10	20.7	< 0.10	1.02	5.71	< 0.050	8.2	0.838	< 0.0010	< 0.0020	0.0024	1.16	0.97
GH_GA-MW-2	GH_GA-MW-2_WG_2018-01-01_NP	2018 03 21	1,010	556	7.97	727	3.3	0.86	213	< 1.0	< 1.0	213	1.3	< 0.25	7.46	100	272	< 3.0	150	< 10	44.0	3.49	1.25	10.5	0.244	< 5.0	16.1	< 0.0050	0.0067	0.0027	1.40	1.16
	GH_GA-MW-2_WG_2018-04-01_NP	2018 05 17	806	477	8.13	562	10.0	5.42	208	< 1.0	< 1.0	208	3.1	< 0.050	7.61	142	226	< 3.0	128	11	38.0	71.8	1.14	8.71	0.281	< 5.0	3.70	0.101	0.0147	0.0022	1.47	1.53
	GH_GA-MW-2_WG_2018-07-01_NP	2018 09 12	879	458	7.96	655	2.4	0.73	219	< 1.0	< 1.0	219	-5.4	< 0.25	7.5	130	273	< 3.0	123	< 10	36.9	70.3	1.14	9.15	0.298	< 5.0	5.68	0.136	0.0053	< 0.0010	< 0.50	< 0.50
	GH_GA-MW-2_WG_2018-10-01_NP	2018 11 26	881	539	8.18	595	1.4	1.28	216	< 1.0	< 1.0	216	3.9	< 0.25	7.1	140	265	< 10	148	< 100	41.2	100	1.23	9.82	0.208	19.7	4.80	0.144	0.0025	0.0023	1.33	0.51
GH_GA-MW-3	GH_GA-MW-3_WG_2018-01-01_NP	2018 03 07	576	232	8.36	328	7.1	34.8	278	9.0	< 1.0	287	-1.7	< 0.050	6.06	728	27.4	< 3.0	43.1	13	30.1	8.91	2.44	36.2	0.382	367	< 0.0050	< 0.0010	0.0201	< 0.0010	1.31	0.54
	GH_GA-MW-3_WG_2018-04-01_NP	2018 05 16	988	593	7.81	764	26.4	0.58	183	< 1.0	< 1.0	183	0.2	< 0.050	9.03	174	387	< 3.0	129	99	66.0	67.9	1.48	8.12	0.436	44.0	3.48	0.0800	0.0128	< 0.0010	3.24	2.96
	GH_GA-MW-3_WG_2018-07-01_NP	2018 09 12	588	243	8.42	378	12.6	52.2	281	5.4	< 1.0	287	-3.0	< 0.050	6.11	694	45.8	3.6	44.0	< 10	32.4	9.77	2.37	35.5	0.484	371	0.0087	0.0011	0.0342	0.0293	1.15	1.63
	GH_GA-MW-3_WG_2018-10-01_NP	2018 11 26	579	255	8.49	290	2.6	39.8	277	15.2	< 1.0	292	0.7	< 0.050	6.39	750	30.9	< 3.0	46.5	< 10	33.7	6.98	2.43	37.2	0.391	334	0.0052	0.0011	0.0058	0.0043	< 0.50	< 0.50
GH_MW-UTC-1S	GH_MW_UTC_1S_WG_2018-03-22_NP	2018 03 22	523	242	8.03	296	210	58.2	232	< 1.0	< 1.0	232	0.2	< 0.050	9.59	99	34.2	< 3.0	64.9	< 10	19.4	30.5	1.31	17.8	0.193	13.9	0.0189	< 0.0010	0.148	0.0026	0.92	4.0
	GH_MW-UTC-1S_WG_2018-04-01_NP	2018 06 13	448	225	8.36	258	5.8	5.85	202	7.2	< 1.0	209	2.1	< 0.050	5.76	164	29.8	< 3.0	59.2	20	18.8	11.5	1.18	15.1	< 0.050	7.7	< 0.40	< 0.0010	0.0132	< 0.0010	1.15	1.08
	GH_MW-UTC-1S_WG_2018-07-01_NP	2018 08 22	375	212	8.32	272	14.8	13.0	180	1.8	< 1.0	182	5.4	< 0.050	5.81	174	28.5	< 3.0	55.9	95	17.6	21.9	1.14	14.5	0.094	14.6	0.0746	< 0.0010	0.0185	0.0015	1.26	1.73
	GH_MW_UTC_1S_WG_2018-10-01_NP	2018 11 29	467	244	8.30	236	118	42.4	224	< 1.0	< 1.0	224	1.3	< 0.050	8.13	167	33.0	< 3.0	65.5	< 10	19.5	12.6	1.17	14.5	0.156	30.4	0.0474	< 0.0010	0.178	0.0029	1.02	3.77
	GH_GHER1_WG_2018-10-01_NP	Duplicate	473	242	8.15	268	36.1	31.0	222	< 1.0	< 1.0	222	0.8	< 0.050	8.18	166	33.3	< 3.0	64.7	< 10	19.5	11.2	1.17	13.8	0.072	23.0	0.0491	< 0.001	0.0359	0.0026	1.36	1.39
	QA/QC RPD%		1	1	2	13	106	31	1	*	*	1	*	*	1	1	1	*	1	*	0	12	0	5	*	*	4	*	133	*	*	*
GH_MW-UTC-1D	GH_MW-UTC-1D_WG_2018-01-01_NP	2018 03 08	1,620	12.4	8.86	1,010	4.1	27.7	653	76.2	< 1.0	729	0.2	0.42	75.3	***6,200***	21.0	121	3.31	133	1.01	22.8	0.98	397	0.515	298	1.24	< 0.0050	0.258	0.216	6.69	6.8
	GH_MW-UTC-1D_WG_2018-04-01_NP	2018 06 13	1,630	11.5	8.92	968	6.0	13.3	698	85.8	< 1.0	784	-2.5	0.39	76.6	***6,620***	46.1	10.7	3.01	212	0.98	23.6	1.06	412	0.256	230	0.51	< 0.0050	0.265	0.185	5.77	7.66
	GH_GWD3_WG_2018-04-01_NP	Duplicate	1,620	11.7	8.88	1,000	4.4	13.3	702	78.8	< 1.0	781	-2.0	0.42	77.0	***6,520***	19.6	9.2	3.09	224	0.97	22.8	1.03	403	0.133	9	< 0.40	< 0.0050	0.261	0.182	6.26	8.75
		QA/QC RPD%	1	2	0	3	*	0	1	9	*	< 1	*	7	1	2	81	*	3	6	1	3	3	2	*	*	*	*	2	2	8	13
	GH_MW-UTC-1D_WG_2018-07-01_NP	2018 08 22	1,580	11.2	9.06	1,010	2.2	12.3	702	106	< 1.0	808	-2.0	0.398	72.7	***6,160***	16.8	12.9	2.96	169	0.93	20.5	0.95	411	0.707	242	< 0.0050	< 0.0050	0.317	0.182	7.0	8.8
	GH_GHER2_WG_2018-07-01_NP	Duplicate	1,520	11.2	8.68	1,010	2.0	12.2	757	41.6	< 1.0	799	-1.1	0.401	72.8	***6,230***	16.9	15.3	2.96	186	0.93	21.2	0.97	414	0.691	241	< 0.0050	< 0.0050	0.302	0.171	6.12	8.3
		QA/QC RPD%	4	0	4	0	*	1	8	87	*	1	*	1	< 1	1	1	*	0	10	0	3	2	1	2	< 1	*	*	5	6	13	6
	GH_UTC_1D_WG_2018-10-01_NP	2018 11 28	1,610	10.1	8.65	950	2.5	11.9	734	40.0	< 1.0	774	-3.2	0.35	69.8	***6,220***	13.6	225	2.71	279	0.81	19.7	0.899	383	0.636	324	< 0.025	< 0.0050	0.296	0.258	7.21	8.40

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< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with Hardness.
[d] Standard varies with Chloride.
[e] Standard varies with crop.
[f] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[h] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Metals																							
			Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[h] µg/L
BC Standard																										
CSR Aquatic Life (AW)[a]			90	50	10,000	1.5	n/a	12,000	0.5-4[c]	10[f]	40	20-90[c]	40-160[c]	n/a	0.25	10,000	250-1,500[c]	20	n/a	0.5-15[c]	n/a	3	n/a	1,000	85	n/a	75-2,400[c]
CSR Irrigation Watering (IW)			n/a	100	n/a	100	n/a	500-6,000[e]	5	5[f]	50	200	200	2,500	1	10	200	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	n/a
CSR Livestock Watering (LW)			n/a	25	n/a	100	n/a	5,000	80	50[f]	1,000	300	100	5,000	2	50	1,000	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			6	10	1,000	8	n/a	5,000	5	50[f]	20[g]	1,500	10	8	1	250	80	10	n/a	20	2,500	n/a	2,500	n/a	20	20	3,000
Elk River																										
GH_GA-MW-1	GH_GA-MW-1_WG_2018-01-01_NP	2018 03 13	1.82	0.62	47.1	< 0.020	< 0.050	*747*	0.0546	0.23	0.80	**134**	< 0.050	147	< 0.0050	9.21	3.76	0.093	3,760	< 0.010	4,340	0.046	< 0.10	< 10	2.70	< 0.50	17.7
	GH_GA-MW-1_WG_2018-04-01_NP	2018 05 17	1.89	0.63	44.0	< 0.020	< 0.050	*782*	0.0722	0.18	0.77	***245***	< 0.050	139	< 0.0050	9.30	5.33	0.11	3,690	< 0.010	4,440	0.046	< 0.10	< 10	2.40	< 0.50	23.5
	GH_GA-MW-1_WG_2018-07-01_NP	2018 08 27	0.76	0.63	43.7	< 0.020	< 0.050	*709*	0.0326	< 0.10	0.84	59.7	< 0.050	137	< 0.0050	8.75	3.97	0.095	3,910	< 0.010	4,040	0.040	< 0.10	< 10	1.92	< 0.50	6.8
	GH_GA-MW-1_WG_2018-10-01_NP	2018 11 21	0.56	0.47	46.7	< 0.020	< 0.050	*868*	0.0270	0.17	0.55	**108**	< 0.050	163	< 0.0050	6.22	4.13	0.208	3,970	< 0.010	4,710	0.032	< 0.10	< 10	1.89	< 0.50	46.4
GH_GA-MW-4	GH_GA-MW-4_WG_2018-01-01_NP	2018 03 21	0.15	0.10	68.8	< 0.020	< 0.050	17	0.0062	0.38	< 0.10	1.26	< 0.050	22.4	< 0.0050	2.39	< 0.50	2.23	2,630	< 0.010	178	< 0.010	< 0.10	< 10	1.65	< 0.50	< 3.0
	GH_GA-MW-4_WG_2018-04-01_NP	2018 05 17	0.17	< 0.10	70.9	< 0.020	< 0.050	< 20	0.0082	0.18	< 0.10	1.74	< 0.050	21.8	< 0.0050	2.16	< 0.50	4.95	2,340	< 0.010	190	< 0.010	< 0.10	< 10	1.61	< 0.50	< 1.0
	GH_GA-MW-4_WG_2018-07-01_NP	2018 08 27	0.16	0.12	74.7	< 0.020	< 0.050	15	0.0114	0.17	< 0.10	2.10	0.060	18.3	< 0.0050	2.11	< 0.50	2.51	2,450	< 0.010	172	< 0.010	< 0.10	< 10	1.63	< 0.50	6.0
	GH_GA-MW-4_WG_2018-10-01_NP	2018 11 21	0.15	< 0.10	76.7	< 0.020	< 0.050	15	0.0067	0.17	< 0.10	0.62	< 0.050	18.8	< 0.0050	1.91	< 0.50	2.61	2,400	< 0.010	179	< 0.010	< 0.10	< 10	1.47	< 0.50	< 1.0
GH_GA-MW-2	GH_GA-MW-2_WG_2018-01-01_NP	2018 03 21	0.65	0.18	76.7	< 0.020	< 0.050	23	0.0660	< 0.10	< 0.10	11.5	< 0.050	18.5	< 0.0050	2.45	2.55	***43.1***	4,150	< 0.010	561	0.016	< 0.10	< 10	2.41	< 0.50	4.4
	GH_GA-MW-2_WG_2018-04-01_NP	2018 05 17	2.37	0.24	57.9	< 0.020	< 0.050	21	< 0.080	2.63	0.37	9.14	< 0.050	16.1	< 0.0050	*68.6*	6.40	8.78	3,440	< 0.010	509	0.010	< 0.10	< 10	5.11	< 0.50	7.1
	GH_GA-MW-2_WG_2018-07-01_NP	2018 09 12	2.07	0.25	54.9	< 0.020	< 0.050	18	< 0.060	< 0.10	0.34	5.61	< 0.050	16.2	< 0.0050	*63.3*	5.22	13.5	3,380	< 0.010	531	< 0.010	< 0.10	< 10	5.80	< 0.50	7.1
	GH_GA-MW-2_WG_2018-10-01_NP	2018 11 26	2.2	< 1.0	51.4	< 0.20	< 0.50	< 100	0.072	< 1.0	< 1.0	7.1	< 0.50	18	< 0.0050	*71.3*	6.7	11.3	3,460	< 0.10	590	< 0.10	< 1.0	< 10	6.90	< 5.0	< 10
GH_GA-MW-3	GH_GA-MW-3_WG_2018-01-01_NP	2018 03 07	< 0.10	< 0.10	107	< 0.020	< 0.10	237	< 0.0050	0.27	< 0.10	< 0.50	< 0.050	94.4	< 0.050	< 0.050	< 0.50	< 0.10	4,800	< 0.010	2,210	< 0.010	< 0.10	< 10	0.036	< 0.50	< 3.0
	GH_GA-MW-3_WG_2018-04-01_NP	2018 05 16	0.14	0.11	69.4	< 0.020	< 0.050	25	0.0164	< 0.10	0.20	< 0.50	< 0.050	21.1	< 0.0050	1.34	2.61	***49.2***	3,260	< 0.010	669	< 0.010	< 0.10	< 10	1.67	< 0.50	6.3
	GH_GA-MW-3_WG_2018-07-01_NP	2018 09 12	< 0.10	< 0.10	85.8	< 0.020	< 0.050	221	< 0.0050	0.12	< 0.10	< 0.50	< 0.050	90.5	< 0.10	< 0.050	< 0.50	3.38	4,510	< 0.010	2,050	< 0.010	< 0.10	< 10	0.068	< 0.50	< 1.0
	GH_GA-MW-3_WG_2018-10-01_NP	2018 11 26	< 0.10	< 0.10	91.0	< 0.020	< 0.050	276	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	96.9	< 0.10	< 0.050	< 0.50	10.3	4,490	< 0.010	2,330	< 0.010	< 0.10	< 10	0.047	< 0.50	< 1.0
GH_MW-UTC-1S	GH_MW_UTC_1S_WG_2018-03-22_NP	2018 03 22	< 0.10	0.28	79.0	< 0.020	< 0.050	104	0.0073	0.15	0.24	< 0.50	< 0.050	42.7	< 0.0050	1.94	0.76	1.51	4,400	< 0.010	1,060	< 0.010	< 0.10	< 10	0.429	< 0.50	4.9
	GH_MW-UTC-1S_WG_2018-04-01_NP	2018 06 13	< 0.10	0.12	74.6	< 0.020	< 0.050	71	0.0105	< 0.10	0.10	< 0.50	< 0.050	32.5	< 0.0050	1.54	0.67	1.72	4,070	< 0.010	922	< 0.010	< 0.10	< 10	0.301	< 0.50	5.6
	GH_MW-UTC-1S_WG_2018-07-01_NP	2018 08 22	< 0.10	0.15	68.9	< 0.020	< 0.050	85	0.0103	< 0.10	0.16	< 0.50	< 0.050	36.6	< 0.0050	1.51	1.32	2.32	4,110	< 0.010	966	< 0.010	< 0.10	< 10	0.269	< 0.50	4.2
	GH_MW_UTC_1S_WG_2018-10-01_NP	2018 11 29	< 0.10	0.16	81.0	< 0.020	< 0.050	92	0.0087	< 0.10	0.10	< 0.50	< 0.050	36.8	< 0.0050	1.63	1.07	2.06	4,360	< 0.010	1,110	< 0.010	< 0.10	< 10	0.281	< 0.50	4.1
	GH_GHER1_WG_2018-10-01_NP	Duplicate	< 0.10	0.16	83.7	< 0.020	< 0.050	88	0.0099	< 0.10	< 0.10	< 0.50	< 0.050	35.7	< 0.0050	1.59	0.63	2.19	4,330	< 0.010	1,080	< 0.010	< 0.10	< 10	0.288	< 0.50	4.2
	QA/QC RPD%		*	*	3	*	*	4	*	*	*	*	*	3	*	2	*	6	1	*	3	*	*	*	2	*	*
GH_MW-UTC-1D	GH_MW-UTC-1D_WG_2018-01-01_NP	2018 03 08	0.56	3.65	51.6	< 0.10	< 0.25	*953*	0.088	< 0.50	< 0.50	3.4	0.61	1,010	0.0055	*22.7*	7.5	0.4	2,850	< 0.050	142	< 0.050	< 0.50	< 10	6.44	< 2.5	**213**
	GH_MW-UTC-1D_WG_2018-04-01_NP	2018 06 13	0.39	3.74	53.6	< 0.040	< 0.10	*818*	0.093	0.27	0.80	3.24	0.72	950	0.0070	*23.0*	21.1	0.69	2,840	0.021	140	< 0.020	0.23	< 10	6.65	2.1	**124**
	GH_GWD3_WG_2018-04-01_NP	Duplicate	0.41	3.51	51.5	< 0.040	< 0.10	*816*	0.090	< 0.20	0.79	3.12	0.62	970	< 0.0050	*23.0*	20.5	0.49	2,780	< 0.020	140	< 0.020	0.22	< 10	6.64	2.1	**122**
		QA/QC RPD%	*	6	4	*	*	0	3	*	1	4	15	2	*	0	3	34	2	*	0	*	*	*	0	*	2
	GH_MW-UTC-1D_WG_2018-07-01_NP	2018 08 22	0.25	3.63	48.4	< 0.040	< 0.10	*965*	0.084	0.41	0.78	2.61	0.44	1,090	0.0068	*21.3*	24.0	0.54	2,830	< 0.020	147	< 0.020	< 0.20	< 10	6.14	2.3	55.3
	GH_GHER2_WG_2018-07-01_NP	Duplicate	0.25	3.69	50.8	< 0.040	< 0.10	*942*	0.123	0.46	0.79	3.51	0.58	1,070	0.0061	*21.4*	24.6	0.82	2,780	0.020	153	< 0.020	< 0.20	< 10	6.20	2.4	63.2
		QA/QC RPD%	*	2	5	*	*	2	38	*	1	29	27	2	*	< 1	2	41	2	*	4	*	*	*	1	*	13
	GH_UTC_1D_WG_2018-10-01_NP	2018 11 28	< 0.10	1.96	54.9	0.026	< 0.050	*810*	0.0778	0.86	0.39	1.21	0.218	1,030	0.0051	*21.2*	14.5	1.29	3,280	0.012	155	< 0.010	0.13	< 10	5.88	2.50	37.1

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* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
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[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with Hardness.
[d] Standard varies with Chloride.
[e] Standard varies with crop.
[f] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[h] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Physical Parameters						Geochemical Indicators																				Organics	
			Conductivity	Hardness	pH	Total Dissolved Solids	Total Suspended Solids	Turbidity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Total Alkalinity	Cation Anion Balance	Bromide	Chloride	Fluoride	Sulphate	Dissolved Aluminum	Dissolved Calcium	Dissolved Iron	Dissolved Magnesium	Dissolved Manganese	Dissolved Potassium	Dissolved Sodium	Kjeldahl Nitrogen-N	Ammonia, Total (as N)	Nitrate Nitrogen	Nitrite Nitrogen	Total Phosphorous as P	Ortho-Phosphate	Dissolved Organic Carbon	Total Organic Carbon
			µS/cm	mg/L	pH	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	%	mg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																															
CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[c]	1,280-4,290[c]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,310-18,500[b]	400	0.2-2[d]	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	5,000	n/a	5,000	n/a	200	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	5,000	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	10	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	9,500	n/a	6,500	n/a	1,500	n/a	200	n/a	n/a	10	1	n/a	n/a	n/a	n/a
Fording River																															
GH_MW-PC	GH_MW-PC_WG-2018-01-01_NP	2018 03 28	1,090	567	8.26	789	1.6	3.04	186	< 1.0	< 1.0	186	-4.9	0.059	0.88	259	417	3.1	101	21	76.5	0.44	0.81	0.90	< 0.050	8.1	1.94	< 0.0010	0.0071	0.0060	1.08	0.91
	GH_MW-PC_WG_2018-04-01_NP	2018 06 19	1,140	669	8.43	881	137	74.3	232	7.8	< 1.0	239	-5.5	< 0.25	< 2.5	420	481	5.9	124	< 20	87.2	0.85	1.05	0.97	< 0.10	11.6	2.49	< 0.0050	0.121	0.0082	1.80	5.5
	GH_MW-PC_WG_2018-07-01_NP	2018 08 20	983	648	8.03	847	443	271	233	< 1.0	< 1.0	233	-2.2	< 0.25	1.09	390	423	< 3.0	123	< 10	83.0	0.57	1.26	1.01	0.246	7.7	1.56	< 0.0050	0.309	0.0086	1.83	8.8
	GH_GHER1_WG_2018-07-01_NP	Duplicate	1,010	651	8.55	872	429	225	217	20.0	< 1.0	237	-2.2	< 0.25	1.11	330	423	< 3.0	124	< 10	82.6	0.52	1.27	1.01	0.292	< 5.0	1.56	< 0.0050	0.307	0.0091	1.29	6.4
		QA/QC RPD%	3	< 1	6	3	3	19	7	*	*	2	*	*	2	17	0	*	1	*	< 1	9	1	0	*	*	0	*	1	6	*	32
	GH_MW-PC_WG_2018-10-01_NP	2018 12 12	1,040	628	8.34	-	-	-	207	5.4	< 1.0	212	-2.9	< 0.25	< 2.5	330	430	< 3.0	121	< 10	78.9	0.25	0.914	0.89	0.117	44.0	2.14	< 0.0050	0.0787	0.0150	0.63	1.03
GH_MW-GHC-1S	GH_MW-GHC-1S_WG_2018-01-01_NP	2018 03 14	1,420	889	8.18	1,120	2.3	9.05	210	< 1.0	< 1.0	210	2.7	< 0.050	6.98	139	610	< 3.0	254	659	62.2	154	1.79	4.54	0.140	20.7	< 0.0050	< 0.0010	0.0050	< 0.0010	1.94	1.78
	GH_GWD2_WG_2018-01-01_NP	Duplicate	1,440	899	8.15	1,130	4.7	9.13	219	< 1.0	< 1.0	219	2.9	< 0.050	7.01	124	607	< 3.0	259	670	61.4	154	1.77	4.44	0.124	25.6	< 0.0050	< 0.0010	0.0075	< 0.0010	1.94	1.85
		QA/QC RPD%	1	1	0	1	*	1	4	*	*	4	*	*	< 1	11	< 1	*	2	2	1	0	1	2	*	*	*	*	40	*	*	*
	GH_MW-GHC-1S_WG_2018-04-01_NP	2018 06 14	1,350	834	8.17	1,140	22.9	35.8	213	< 1.0	< 1.0	213	-0.9	< 0.25	8.7	250	615	< 3.0	234	1,630	60.7	*426*	1.79	4.47	0.089	30.4	< 0.40	< 0.0050	0.0257	< 0.0010	1.72	1.85
	GH_MW-GHC-1S_WG_2018-07-01_NP	2018 09 13	1,390	774	8.04	1,070	5.5	12.2	278	< 1.0	< 1.0	278	-7.8	< 0.25	8.8	200	608	< 3.0	218	1,010	56.1	*348*	1.92	4.70	< 0.050	29.9	0.056	< 0.0050	0.0070	< 0.0010	2.39	2.20
	GH_MW-GHC-1S_WG_2018-10-01_NP	2018 12 05	1,280	802	8.15	1,060	9.0	15.4	247	< 1.0	< 1.0	247	0	< 0.25	7.7	210	537	< 3.0	230	984	55.6	*318*	1.97	4.90	0.210	49.1	< 0.025	< 0.0050	0.0070	< 0.0010	2.81	2.84
GH_MW-GHC-1D	GH_MW-GHC-1D_WG_2018-01-01_NP	2018 01 23	985	620	7.60	718	1.4	2.38	295	< 1.0	< 1.0	295	1.8	< 0.25	1.65	570	300	< 3.0	154	26	57.3	0.28	1.49	5.39	< 0.050	< 5.0	0.108	< 0.0050	0.0057	0.0035	1.07	1.00
	GH_GWD3_WG_2018-01-01_NP	Duplicate	993	616	7.58	727	2.4	2.43	290	< 1.0	< 1.0	290	1.6	< 0.25	1.66	550	302	< 3.0	150	< 10	58.7	0.17	1.46	5.33	< 0.050	< 5.0	0.113	< 0.0050	0.0056	0.0034	1.20	0.83
		QA/QC RPD%	1	1	0	1	*	2	2	*	*	2	*	*	1	4	1	*	3	*	2	*	2	1	*	*	5	*	2	*	*	*
	GH_MW-GHC-1D_WG_2018-04-01_NP	2018 06 14	1,040	593	8.29	765	1.9	2.65	272	3.8	< 1.0	276	-1.0	< 0.25	3.2	570	322	< 3.0	151	< 10	52.3	0.16	1.36	4.61	< 0.050	< 5.0	< 0.40	0.0172	0.0067	0.0019	1.11	1.00
	GH_MW-GHC-1D_WG_2018-07-01_NP	2018 09 13	1,030	563	8.13	743	< 1.0	3.30	321	< 1.0	< 1.0	321	-7.6	< 0.25	< 2.5	520	334	< 3.0	139	< 10	52.5	0.18	1.35	4.92	< 0.050	< 5.0	0.221	< 0.0050	0.0104	0.0039	1.54	1.27
	GH_MW-GHC-1D_WG_2018-10-01_NP	2018 12 05	931	574	8.09	677	1.4	5.40	276	< 1.0	< 1.0	276	1.7	< 0.25	< 2.5	530	279	< 3.0	145	< 10	51.7	< 0.10	1.42	5.16	0.229	23.7	0.111	< 0.0050	0.0099	0.0052	2.29	2.36
GH_MW-TD	GH_MW-TD_WG_2018-01-01_NP	2018 01 23	744	388	7.73	461	4.9	10.9	336	< 1.0	< 1.0	336	3.8	< 0.25	0.52	270	87.6	< 3.0	91.1	832	39.1	*723*	2.61	30.9	0.089	92.9	< 0.025	< 0.0050	< 0.0020	0.0010	< 0.50	< 0.50
	GH_MW-TD_WG_2018-04-01_NP	2018 06 18	736	370	7.93	471	6.8	12.1	345	< 1.0	< 1.0	345	0.6	< 0.050	< 0.50	294	86.6	< 3.0	86.2	1,060	37.6	*696*	2.56	29.5	0.063	98.5	< 0.0050	< 0.0010	0.0045	< 0.0010	< 0.50	< 0.50
	GH_MW-TD_WG_2018-07-01_NP	2018 08 30	715	334	8.00	458	2.9	9.10	349	< 1.0	< 1.0	349	-5.2	< 0.25	0.55	290	87.9	< 3.0	79.8	1,040	32.7	*669*	2.32	26.6	0.101	105	< 0.025	< 0.0050	< 0.0020	< 0.0010	1.06	1.05
	GH_MW-TD_WG_2018-10-01_NP	2018 12 05	699	353	7.91	439	1.6	8.27	339	< 1.0	< 1.0	339	-0.5	< 0.050	< 0.50	272	83.6	< 3.0	84.4	1,570	34.5	*720*	2.34	28.0	0.270	105	< 0.0050	< 0.0010	< 0.010	0.0015	1.35	1.26
GH_MW-RLP-1D	GH_MW-RLP_WG_2018-01-01_NP	2018 03 06	405	217	8.34	224	4.7	45.2	211	5.6	< 1.0	216	1.4	< 0.050	0.42	*1,680*	0.68	5.3	40.0	34	28.3	1.95	1.30	4.65	< 0.050	< 5.0	< 0.0050	< 0.0010	0.0060	< 0.0010	2.65	3.03
	GH_MW-RLP_WS_2018-05-28_N	2018 05 31	400	219	8.14	218	4.9	44.2	202	< 1.0	< 1.0	202	5.2	< 0.050	< 0.50	*1,930*	0.67	7.9	37.9	21	30.1	3.63	1.28	4.75	< 0.050	< 20	< 0.005	< 0.001	0.0069	0.0010	6.73	6.60
	GH_MW-RLP_WG_2018-07-01_NP	2018 09 17	316	160	8.72	155	17.1	20.6	179	< 1.0	< 1.0	179	-3.7	< 0.050	0.73	*1,610*	< 0.30	< 3.0	21.2	< 10	26.0	8.24	1.33	4.40	0.197	12.2	< 0.0050	< 0.0010	0.0097	< 0.0010	10.0	9.48
	GH_MW-RLP_WG_2018-10-01_NP	2018 11 29	280	158	8.38	153	9.7	10.2	144	3.4	< 1.0	147	5.4	< 0.050	0.82	*1,580*	< 0.30	< 3.0	14.7	42	29.4	8.54	1.44	4.56	< 0.050	27.2	< 0.0050	< 0.0010	0.0029	0.0018	15.8	15.9
Field Blanks																															
GH_MW-GHC-1S	GH_GWB2_WG_2018-01-01_NP	2018 03 14	< 2.0	< 0.50	5.43	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	0	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	5.1	< 0.0050	< 0.0010	< 0.0010	< 0.0010	< 0.50	< 0.50
GH_MW-UTC-1D	GH_GWB3_WG_2018-04-01_NP	2018 06 13	< 2.0	< 0.50	4.87	< 10	< 1.0	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	0	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 5.0	< 0.40	< 0.0010	< 0.0010	< 0.0010	< 0.50	< 0.50
GH_MW-PC	GH_GHLRP1_WG_2018-07-01_NP	2018 08 20	< 2.0	< 0.50	5.82	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	0	< 0.050	< 0.10	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	0.319	271	< 0.0050	< 0.0010	< 0.0020	0.0011	< 0.50	< 0.50
GH_MW-UTC-1D	GH_GHLRP2_WG_2018-07-01_NP	2018 08 22	2.4	< 0.50	5.98	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	0	< 0.050	< 0.10	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	0.141	115	< 0.0050	< 0.0010	< 0.0020	0.0013	0.59	< 0.50
GH_MW-UTC-1S	GH_GHLRP1_WG_2018-10-01_NP	2018 11 29	< 2.0	< 0.50	5.61	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	0	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	0.417	390	< 0.0050	< 0.0010	0.0043	0.0013	< 0.50	< 0.50

Associated data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with Hardness.
[d] Standard varies with Chloride.
[e] Standard varies with crop.
[f] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[h] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Metals																							
			Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[h] µg/L
BC Standard																										
CSR Aquatic Life (AW)[a]			90	50	10,000	1.5	n/a	12,000	0.5-4[c]	10[f]	40	20-90[c]	40-160[c]	n/a	0.25	10,000	250-1,500[c]	20	n/a	0.5-15[c]	n/a	3	n/a	1,000	85	n/a	75-2,400[c]
CSR Irrigation Watering (IW)			n/a	100	n/a	100	n/a	500-6,000[e]	5	5[f]	50	200	200	2,500	1	10	200	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	n/a
CSR Livestock Watering (LW)			n/a	25	n/a	100	n/a	5,000	80	50[f]	1,000	300	100	5,000	2	50	1,000	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			6	10	1,000	8	n/a	5,000	5	50[f]	20[g]	1,500	10	8	1	250	80	10	n/a	20	2,500	n/a	2,500	n/a	20	20	3,000
Fording River																										
GH_MW-PC	GH_MW-PC_WG-2018-01-01_NP	2018 03 28	< 0.20	< 0.20	91.3	< 0.040	< 0.10	< 20	0.035	< 0.20	< 0.20	35.7	< 0.10	5.9	< 0.0050	2.76	< 1.0	***61.3***	2,330	< 0.020	138	< 0.020	< 0.20	< 10	4.52	< 1.0	4.1
	GH_MW-PC_WG_2018-04-01_NP	2018 06 19	< 0.20	< 0.20	105	< 0.040	< 0.10	< 20	0.028	*5.60*	< 0.20	28.0	< 0.10	8.1	< 0.0050	2.86	1.3	***84***	2,610	< 0.020	149	< 0.020	< 0.20	< 10	5.46	< 1.0	2.5
	GH_MW-PC_WG_2018-07-01_NP	2018 08 20	< 0.10	0.21	106	< 0.020	< 0.050	< 10	0.0536	0.28	< 0.10	***542***	< 0.050	9.5	< 0.0050	2.66	0.75	***65.7***	2,920	< 0.010	149	< 0.010	< 0.10	< 10	5.10	< 0.50	3.5
	GH_GHER1_WG_2018-07-01_NP	Duplicate	< 0.10	0.21	107	< 0.020	< 0.050	< 10	0.0516	0.30	< 0.10	***566***	< 0.050	9.3	< 0.0050	2.67	0.71	***65.9***	2,890	< 0.010	153	< 0.010	< 0.10	< 10	5.17	< 0.50	2.8
		QA/QC RPD%	*	*	1	*	*	*	4	*	*	4	*	2	*	< 1	*	< 1	1	*	3	*	*	*	1	*	*
	GH_MW-PC_WG_2018-10-01_NP	2018 12 12	<0.10	0.15	97.8	< 0.020	< 0.050	< 10	0.0353	0.38	< 0.10	**183**	< 0.050	7.2	0.0096	2.35	0.59	***70.3***	2,440	< 0.010	143	< 0.010	< 0.10	< 10	4.38	< 0.50	2.2
GH_MW-GHC-1S	GH_MW-GHC-1S_2018-01-01_NP	2018 03 14	< 0.10	0.92	28.5	< 0.020	< 0.050	34	0.0267	< 0.10	0.34	< 0.50	< 0.050	21.8	< 0.0050	1.47	1.62	0.494	5,500	< 0.010	682	0.015	< 0.10	< 10	1.60	< 0.50	< 3.0
	GH_GWD2_WG_2018-01-01_NP	Duplicate	< 0.10	0.87	27.7	< 0.020	< 0.050	35	0.0191	< 0.10	0.34	< 0.50	< 0.050	23.0	< 0.0050	1.43	1.62	0.45	5,410	< 0.010	677	0.015	< 0.10	< 10	1.60	< 0.50	< 3.0
		QA/QC RPD%	*	6	3	*	*	*	*	*	*	*	*	5	*	3	*	9	2	*	1	*	*	*	0	*	*
	GH_MW-GHC-1S_WG_2018-04-01_NP	2018 06 14	< 0.10	1.17	23.7	< 0.020	< 0.050	35	0.0056	< 0.10	0.60	< 0.50	< 0.050	20.7	< 0.0050	1.04	1.44	< 0.050	5,680	< 0.010	687	< 0.010	< 0.10	< 10	1.75	< 0.50	1.2
	GH_MW-GHC-1S_WG_2018-07-01_NP	2018 09 13	< 0.10	1.39	26.3	< 0.020	< 0.050	46	0.0113	< 0.10	0.55	0.52	< 0.050	22.5	< 0.0050	1.02	1.32	< 0.050	6,310	< 0.010	640	< 0.010	< 0.10	< 10	1.87	< 0.50	3.6
	GH_MW-GHC-1S_WG_2018-10-01_NP	2018 12 05	< 0.10	1.29	28.7	< 0.020	< 0.050	45	0.0076	< 0.10	0.55	< 0.50	< 0.050	22.3	< 0.0050	0.997	1.36	< 0.050	6,180	< 0.010	638	< 0.010	< 0.10	< 10	1.84	< 0.50	1.1
GH_MW-GHC-1D	GH_MW-GHC-1D_WG_2018-01-01_NP	2018 01 23	< 0.10	< 0.10	88.4	< 0.020	< 0.050	35	0.0215	1.12	< 0.10	< 0.50	< 0.050	18.4	< 0.0050	0.992	1.04	4.15	4,680	< 0.010	486	0.025	< 0.10	< 10	2.56	< 0.50	< 3.0
	GH_GWD3_WG_2018-01-01_NP	Duplicate	< 0.10	< 0.10	91.1	< 0.020	< 0.050	34	0.0240	< 0.10	< 0.10	< 0.50	< 0.050	18.1	< 0.0050	0.717	0.98	4.37	4,830	< 0.010	460	0.023	< 0.10	< 10	2.57	< 0.50	< 3.0
		QA/QC RPD%	*	*	3	*	*	*	*	*	*	*	*	2	*	32	*	5	3	*	5	*	*	*	< 1	*	*
	GH_MW-GHC-1D_WG_2018-04-01_NP	2018 06 14	< 0.10	< 0.10	83.6	< 0.020	< 0.050	32	0.0239	< 0.10	< 0.10	< 0.50	< 0.050	16.9	< 0.0050	0.741	1.45	3.98	4,380	< 0.010	468	0.022	< 0.10	< 10	2.76	< 0.50	< 1.0
	GH_MW-GHC-1D_WG_2018-07-01_NP	2018 09 13	< 0.10	< 0.10	81.6	< 0.020	< 0.050	34	0.0179	< 0.10	< 0.10	< 0.50	< 0.050	17.2	< 0.0050	0.672	0.89	5.24	4,600	< 0.010	443	0.023	< 0.10	< 10	2.84	< 0.50	< 1.0
	GH_MW-GHC-1D_WG_2018-10-01_NP	2018 12 05	< 0.10	< 0.10	89.4	< 0.020	< 0.050	39	0.0175	< 0.10	< 0.10	< 0.50	< 0.050	17.1	< 0.0050	0.655	0.98	4.68	4,500	< 0.010	444	0.022	< 0.10	< 10	2.83	< 0.50	< 1.0
GH_MW-TD	GH_MW-TD_WG_2018-01-01_NP	2018 01 23	< 0.10	0.15	24.3	< 0.020	< 0.050	367	0.0526	< 0.10	0.44	< 0.50	< 0.050	43.8	< 0.0050	2.65	1.14	0.215	6,540	< 0.010	1,230	0.037	< 0.10	< 10	0.782	< 0.50	< 3.0
	GH_MW-TD_WG_2018-04-01_NP	2018 06 18	< 0.10	0.14	23.7	< 0.020	< 0.050	342	0.232	< 0.10	0.41	< 0.50	< 0.050	40.4	< 0.0050	2.67	0.84	< 0.050	6,430	< 0.010	1,150	0.110	< 0.10	< 10	1.01	< 0.50	< 1.0
	GH_MW-TD_WG_2018-07-01_NP	2018 08 30	< 0.10	0.13	21.5	< 0.020	< 0.050	302	0.339	< 0.10	0.40	< 0.50	< 0.050	39.7	< 0.0050	2.73	0.79	0.118	5,950	< 0.010	1,100	0.136	< 0.10	< 10	0.948	< 0.50	1.2
	GH_MW-TD_WG_2018-10-01_NP	2018 12 05	< 0.10	0.22	24.2	< 0.020	< 0.050	353	0.288	< 0.10	0.56	1.87	< 0.050	39.6	< 0.0050	2.75	1.30	< 0.050	6,230	< 0.010	1,080	0.026	< 0.10	< 10	0.955	< 0.50	< 1.0
GH_MW-RLP-1D	GH_MW-RLP_WG_2018-01-01_NP	2018 03 06	< 0.10	0.15	49.6	< 0.020	< 0.050	15	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	6.2	< 0.050	0.132	< 0.50	4.26	4,720	< 0.010	186	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
	GH_MW-RLP_WS_2018-05-28_N	2018 05 31	< 0.10	0.15	48.5	< 0.020	< 0.050	15	< 0.0050	0.14	< 0.10	< 0.50	< 0.050	7.4	< 0.0050	0.094	< 0.50	1.61	4,560	< 0.010	185	< 0.010	< 0.10	< 10	< 0.010	< 0.50	5.5
	GH_MW-RLP_WG_2018-07-01_NP	2018 09 17	< 0.10	< 0.10	13.1	< 0.020	< 0.050	16	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	7.5	< 0.0050	0.424	< 0.50	< 0.050	1,110	< 0.010	122	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
	GH_MW-RLP_WG_2018-10-01_NP	2018 11 29	< 0.10	< 0.10	16.2	< 0.020	< 0.050	17	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	7.1	< 0.0050	0.380	< 0.50	< 0.050	1,260	< 0.010	102	< 0.010	< 0.10	< 10	< 0.010	< 0.50	1.7
Field Blanks																										
GH_MW-GHC-1S	GH_GWB2_WG_2018-01-01_NP	2018 03 14	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 50	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
GH_MW-UTC-1D	GH_GWB3_WG_2018-04-01_NP	2018 06 13	< 0.10	< 0.10	0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 50	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0
GH_MW-PC	GH_GHLRP1_WG_2018-07-01_NP	2018 08 20	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 50	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
GH_MW-UTC-1D	GH_GHLRP2_WG_2018-07-01_NP	2018 08 22	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 50	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
GH_MW-UTC-1S	GH_GHLRP1_WG_2018-10-01_NP	2018 11 29	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 50	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0

Associated data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with Hardness.
[d] Standard varies with Chloride.
[e] Standard varies with crop.
[f] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[h] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

TABLE 5: Groundwater Analytical Results compared to Secondary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Selenium µg/L
Groundwater Quality Criteria		
Guideline for Canadian Drinking Water Quality (DW)		50
Site Performance Objective: GH_FR1 (0200378)*		63
Compliance Point: FR_FRCP1 (E300071)*		130
Site Performance Objective: GH_ER1 (E206661)**		19
Compliance Point: GH_ERC (E300090)**		15
Elk River		
GH_GA-MW-2	2018 03 21	43.1
	2018 09 12	13.5
	2018 11 26	11.3
GH_GA-MW-3	2018 05 16	49.2
	2018 11 26	10.3
Fording River		
GH_MW-PC	2018 03 28	**61.3**
	2018 06 19	**84**
	2018 08 20	**65.7**
	2018 12 12	**70.3**

Associated data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.

* Applicable to GH_MW-PC
** Applicable to GH_GA-MW-2, GH_GA-MW-3

BOLD	Concentration greater than Canadian Drinking Water Quality guideline
UNDERLINE	Concentration greater than applicable Site Performance Objective
SHADED	Concentration greater than applicable Compliance Point

SNC·LAVALIN

Appendix II-3: Line Creek Operations 2018 Site-Specific Groundwater Monitoring Program

Summary

Golder Associates completed the 2018 Annual Report for the LCO SSGMP (Golder 2019). The following information was taken from the 2018 LCO Annual Report.

Groundwater flow is topographically driven and is recharged on ridges and flanks (uplands) and the majority of groundwater discharges to valley-bottoms. Groundwater mounds below waste rock piles with the majority discharging to surface water at the toe of waste-rock spoils in combination with shallow groundwater before being directed to the nearest surface water body.

The LCO SSGMP includes a total of 10 monitoring wells which are monitored and sampled quarterly for a specific list of analytes. The wells monitored and sampled as part of the 2018 annual program are shown on Figure 2-5, attached. A summary of wells is provided in Table 2-1 and analytical results compared to screening criteria in Tables 4-1 and 4-2. Analytical results for select constituents of interest (CI), including nitrate-nitrogen, sulphate and dissolved selenium, are shown on Figure 4-3 and 4-4, attached.

The results from the 2018 LCO SSGMP show the following:

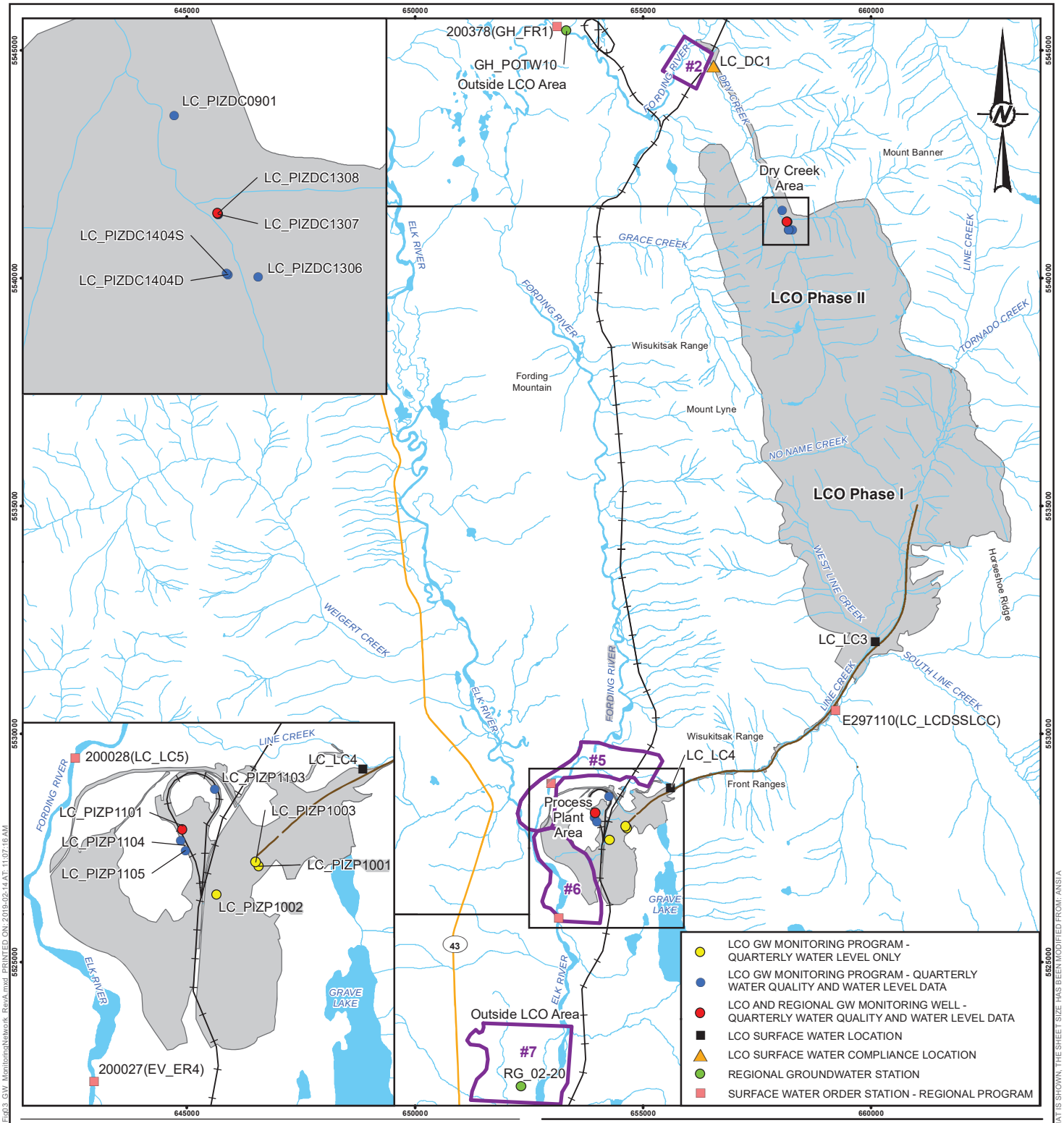
- The LCO SSGMP is considered thorough and robust.
- No material quality assurance or quality control concerns were identified.
- There were no exceedances of BC CSR guidelines for the CIs at sampled groundwater locations within the LCO site. Consistently, there was no clear increasing trend in CIs at groundwater monitoring locations downgradient of LCO, which are also included in the RGMP.
- The Regional and LCO Site Specific programs support the conceptual groundwater model.
- Localized exceedances of dissolved chloride, fluoride, lithium, manganese, and molybdenum at the sampled locations within the Process Plant area. The exceedances listed above could be related to dissolution of naturally-occurring sedimentary minerals and other processes affecting groundwater chemistry, which include reductive dissolution and cation exchange associated with calcite-saturated waters.
- Localized exceedances of dissolved barium, cobalt, lithium, and molybdenum at the sampled locations near the Head Pond diversion structure. This was similar to 2017 findings.
- Surface water drainage from the permitted LCO Phase II into the Dry Creek Area increased dissolved selenium, nitrate, and dissolved sulphate at the surface water station LC_DC1.Increasing trends in sulphate and selenium were identified at monitoring well DC_PIZDC0901 in Q4 but not in Q1; however, the concentrations remained well below the BC CSR guidelines.

LC_PIZDC1307 and LC_PIZDC1404D were drilled deeper than the remaining wells (>31.8 m versus <16.5 m). The groundwater chemistry pertaining to these wells could indicate a greater degree of influence from the underlying bedrock aquifer system given the upward hydraulic gradient within the bedrock, hence, the localized exceedances of dissolved barium and molybdenum.

Recommendations

A thorough review of the 2018 groundwater quality data has been completed as requested by Teck LCO. Recommendations are provided below:

- To obtain continuous records of groundwater levels at LC_PIZP1001, it is recommended to install the pressure transducer as deep as possible to maximize transducer submergence below the fluctuating water level.
- The current groundwater monitoring program should continue, along with continued coordination with the regional program and water treatment plant program. A potential need for new wells was evaluated in the 2018 update of the SSGMP, but the tentatively-assigned triggers for installation of these potential new wells, which may be updated if required as part of the RGMP and a regional AMP, were not met in 2018. A review of the suggested monitoring sampling frequency provided in the updated SSGMP (Golder 2018) should be completed and may lead to an adjusted monitoring/sampling schedule.
- As seasonal trends are established, reduce frequency of sampling from quarterly to twice per year: May to June during freshet when surface flows, groundwater levels, and dilution will be the highest, and November to February during winter when water levels will be the lowest. For any new wells, perform quarterly sampling for two years to stablish seasonal variations.
- Review recommendations in the updated SSGMP (Golder 2018) in conjunction with tentative triggers identified in that report, which may be updated if required as part of the RGMP and a regional Adaptive Management Plan.



LEGEND

- CANADIAN PACIFIC RAILWAY
- EXISTING CABLE BELT
- SECONDARY HIGHWAY
- WATERCOURSE
- KEY AREA IN THE REGIONAL GROUNDWATER MONITORING PROGRAM
- LINE CREEK OPERATIONS
- WATERBODY

0 2,500 5,000

1:120,000 METRES

REFERENCE(S)

HYDROGRAPHY AND TRANSPORTATION DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. OTHER DATA OBTAINED FROM TECK COAL LIMITED.
DATUM: NAD83 PROJECTION: UTM ZONE 11

CLIENT
TECK COAL LIMITED

PROJECT
TECK LINE CREEK OPERATIONS
ANNUAL GROUNDWATER MONITORING PROGRAM

TITLE
LCO GROUNDWATER MONITORING NETWORK - 2018

CONSULTANT
GOLDER

YYYY-MM-DD	2019-02-14
DESIGNED	MC
PREPARED	AA
REVIEWED	
APPROVED	

PROJECT NO.	PHASE	REV.	FIGURE
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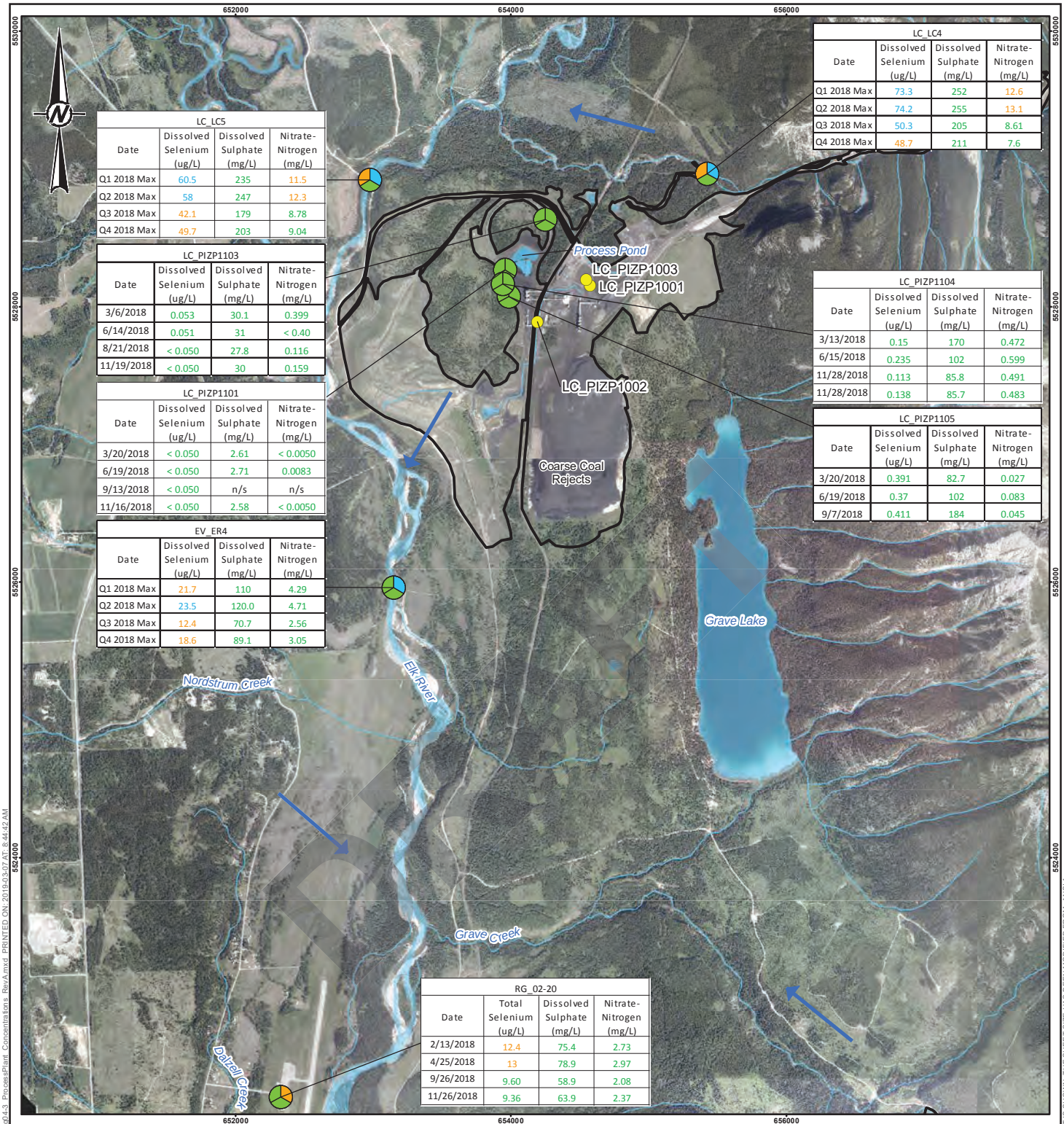

LC_LC5			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
Q1 2018 Max	60.5	235	11.5
Q2 2018 Max	58	247	12.3
Q3 2018 Max	42.1	179	8.78
Q4 2018 Max	49.7	203	9.04

LC_PIZP1103			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
3/6/2018	0.053	30.1	0.399
6/14/2018	0.051	31	< 0.40
8/21/2018	< 0.050	27.8	0.116
11/19/2018	< 0.050	30	0.159

LC_PIZP1101			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
3/20/2018	< 0.050	2.61	< 0.0050
6/19/2018	< 0.050	2.71	0.0083
9/13/2018	< 0.050	n/s	n/s
11/16/2018	< 0.050	2.58	< 0.0050

EV_ER4			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
Q1 2018 Max	21.7	110	4.29
Q2 2018 Max	23.5	120.0	4.71
Q3 2018 Max	12.4	70.7	2.56
Q4 2018 Max	18.6	89.1	3.05

LC_LC4			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
Q1 2018 Max	73.3	252	12.6
Q2 2018 Max	74.2	255	13.1
Q3 2018 Max	50.3	205	8.61
Q4 2018 Max	48.7	211	7.6

LC_PIZP1104			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
3/13/2018	0.15	170	0.472
6/15/2018	0.235	102	0.599
11/28/2018	0.113	85.8	0.491
11/28/2018	0.138	85.7	0.483

LC_PIZP1105			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
3/20/2018	0.391	82.7	0.027
6/19/2018	0.37	102	0.083
9/7/2018	0.411	184	0.045

RG_02-20			
Date	Total Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
2/13/2018	12.4	75.4	2.73
4/25/2018	13	78.9	2.97
9/26/2018	9.60	58.9	2.08
11/26/2018	9.36	63.9	2.37

LEGEND

- BELOW PRIMARY SCREENING CRITERIA
- ABOVE AT LEAST ONE OF THE PRIMARY SCREENING CRITERIA
- SELENIUM CONCENTRATION ABOVE AT LEAST ONE OF THE SECONDARY SCREENING CRITERIA
- LCO GW MONITORING PROGRAM - QUARTERLY WATER LEVEL ONLY
- CONCEPTUAL GROUNDWATER FLOW DIRECTION
- WATERCOURSE
- PROJECT OPERATIONAL BOUNDARY
- WATERBODY

NITRATE-NITROGEN / SELENIUM / SULPHATE

0 500 1,000
1:40,000 METRES

NOTE(S)

SURFACE WATER CONCENTRATIONS WERE COMPARED TO BC CSR DRINKING WATER GUIDELINE IN THIS FIGURE.
n/s = NOT SAMPLED

REFERENCE(S)

HYDROLOGY, PROJECT DATA, AND 2018 ORTHOPHOTO OBTAINED FROM TECK COAL LIMITED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
TECK LINE CREEK OPERATIONS
ANNUAL GROUNDWATER MONITORING PROGRAM

TITLE
LCO PROCESS PLANT AREA SPATIAL DISTRIBUTION OF SELECTED GROUNDWATER ANALYTICAL DATA

CONSULTANT
GOLDER

YYYY-MM-DD	2019-03-07
DESIGNED	MC
PREPARED	AA
REVIEWED	
APPROVED	

PROJECT NO.	PHASE	REV.	FIGURE
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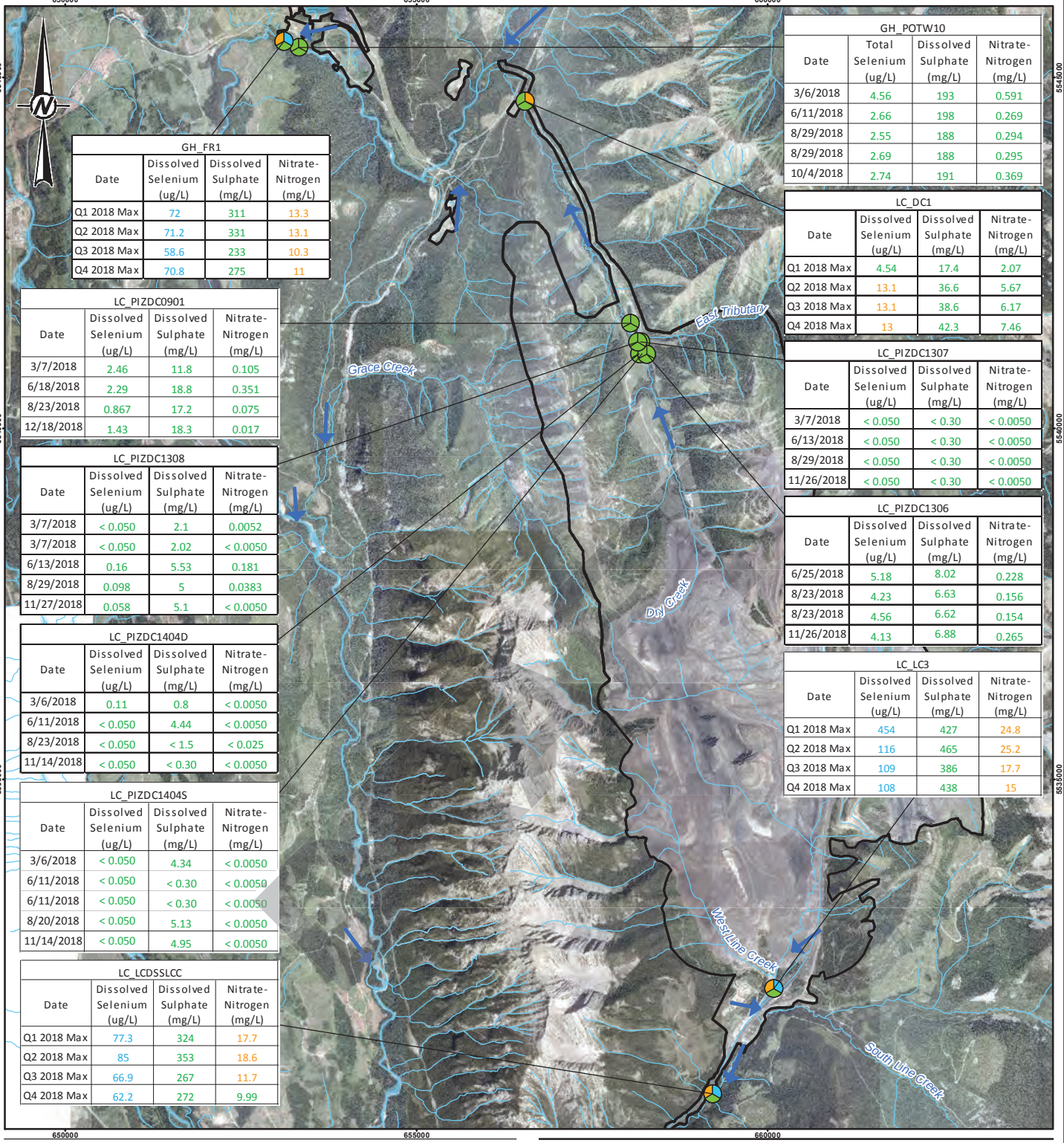

GH_FR1			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
Q1 2018 Max	72	311	13.3
Q2 2018 Max	71.2	331	13.1
Q3 2018 Max	58.6	233	10.3
Q4 2018 Max	70.8	275	11

LC_PIZDC0901			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
3/7/2018	2.46	11.8	0.105
6/18/2018	2.29	18.8	0.351
8/23/2018	0.867	17.2	0.075
12/18/2018	1.43	18.3	0.017

LC_PIZDC1308			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
3/7/2018	< 0.050	2.1	0.0052
3/7/2018	< 0.050	2.02	< 0.0050
6/13/2018	0.16	5.53	0.181
8/29/2018	0.098	5	0.0383
11/27/2018	0.058	5.1	< 0.0050

LC_PIZDC1404D			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
3/6/2018	0.11	0.8	< 0.0050
6/11/2018	< 0.050	4.44	< 0.0050
8/23/2018	< 0.050	< 1.5	< 0.025
11/14/2018	< 0.050	< 0.30	< 0.0050

LC_PIZDC1404S			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
3/6/2018	< 0.050	4.34	< 0.0050
6/11/2018	< 0.050	< 0.30	< 0.0050
6/11/2018	< 0.050	< 0.30	< 0.0050
8/20/2018	< 0.050	5.13	< 0.0050
11/14/2018	< 0.050	4.95	< 0.0050

LC_LCDSSLCC			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
Q1 2018 Max	77.3	324	17.7
Q2 2018 Max	85	353	18.6
Q3 2018 Max	66.9	267	11.7
Q4 2018 Max	62.2	272	9.99

GH_POTW10			
Date	Total Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
3/6/2018	4.56	193	0.591
6/11/2018	2.66	198	0.269
8/29/2018	2.55	188	0.294
8/29/2018	2.69	188	0.295
10/4/2018	2.74	191	0.369

LC_DC1			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
Q1 2018 Max	4.54	17.4	2.07
Q2 2018 Max	13.1	36.6	5.67
Q3 2018 Max	13.1	38.6	6.17
Q4 2018 Max	13	42.3	7.46

LC_PIZDC1307			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
3/7/2018	< 0.050	< 0.30	< 0.0050
6/13/2018	< 0.050	< 0.30	< 0.0050
8/29/2018	< 0.050	< 0.30	< 0.0050
11/26/2018	< 0.050	< 0.30	< 0.0050

LC_PIZDC1306			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
6/25/2018	5.18	8.02	0.228
8/23/2018	4.23	6.63	0.156
8/23/2018	4.56	6.62	0.154
11/26/2018	4.13	6.88	0.265

LC_LC3			
Date	Dissolved Selenium (ug/L)	Dissolved Sulphate (mg/L)	Nitrate-Nitrogen (mg/L)
Q1 2018 Max	454	427	24.8
Q2 2018 Max	116	465	25.2
Q3 2018 Max	109	386	17.7
Q4 2018 Max	108	438	15

LEGEND

- BELOW PRIMARY SCREENING CRITERIA
- ABOVE AT LEAST ONE OF THE PRIMARY SCREENING CRITERIA
- SELENIUM CONCENTRATION ABOVE AT LEAST ONE OF THE SECONDARY SCREENING CRITERIA
- CONCEPTUAL GROUNDWATER FLOW DIRECTION
- WATERCOURSE
- PROJECT OPERATIONAL BOUNDARY
- WATERBODY

NITRATE-NITROGEN / SELENIUM / SULPHATE

0 1,000 2,000

1:80,000 METRES

NOTE(S)

SURFACE WATER CONCENTRATIONS WERE COMPARED TO BC CSR DRINKING WATER GUIDELINE IN THIS FIGURE.

REFERENCE(S)

HYDROLOGY, PROJECT DATA, AND 2018 ORTHOPHOTO OBTAINED FROM TECK COAL LIMITED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
TECK LINE CREEK OPERATIONS
ANNUAL GROUNDWATER MONITORING PROGRAM

TITLE
LCO DRY CREEK AREA SPATIAL DISTRIBUTION OF SELECTED GROUNDWATER ANALYTICAL DATA

CONSULTANT
GOLDER

YYYY-MM-DD	2019-03-07
DESIGNED	MC
PREPARED	AA
REVIEWED	
APPROVED	

PROJECT NO.	PHASE	REV.	FIGURE
19115529	1000	A	4-4

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Table 2-1: Summary of Groundwater Sampling Locations

Area		Well Name	Alternate Well Name	ENV EMS1	Easting (m UTM)	Northing (m UTM)	Monitoring Program	Screened Lithology	Hydraulic Conductivity (m/s)	Depth to Screen (mbgs)	Rationale	2018 Sample Frequency	Parameters Reviewed
Process Plant	Ponds	LC_PIZP1101	MW11(P)-01	E302410	653956	5528265	LCO, Regional	Coarse-grained sand	7.E-04	40.5	Monitor water quality to detect seepage from Process Plant ponds	Quarterly	Se, Cd, NO_3, SO_4
		LC_PIZP1103	MW11(P)-03	none	654250	5528634	LCO	Clayey silt above bedrock	7.E-08	38.1		Quarterly	Se, Cd, NO_3, SO_4
		LC_PIZP1104	MW11(P)-04	none	653940	5528165	LCO	Coarse-grained sand	3.E-04	36.8		Quarterly	Se, Cd, NO_3, SO_4
		LC_PIZP1105	MW11(P)-05	E302411	653984	5528075	LCO	-	-	38.1		Quarterly	Se, Cd, NO_3, SO_4
Dry Creek	Diversion Structure	LC_PIZDC1306	MW13-3S	none	658278	5541059	LCO	Valley-bottom sediments (Quaternary)	3.E-05	16.5	Monitor water quality to detect for seepage near diversion structure for proposed water treatment plant	Last 3 Quarters	Se, Cd, NO_3, SO_4
		LC_PIZDC1307	MW13-1D	none	658169	5541230	LCO, Regional		1.E-07	34.6		Quarterly	Se, Cd, NO_3, SO_4
		LC_PIZDC1308	MW13-1S	none	658168	5541232	LCO, Regional		7.E-07	9		Quarterly	Se, Cd, NO_3, SO_4
		LC_PIZDC1404S	MW14-04S LC-PIZDC1402	none	658192	5541069	LCO		4.E-08	12.6		Quarterly	Se, Cd, NO_3, SO_4
		LC_PIZDC1404D	MW14-04D LC-PIZDC1401	none	658192	5541069	LCO		5.E-08	35.3		Quarterly	Se, Cd, NO_3, SO_4
		LC_PIZDC0901	GA-DC1-A	none	658048	5541500	LCO		9.E-09	9.4		Quarterly	Se, Cd, NO_3, SO_4
Regional Wells	Downgradient of Dry Creek	GH_POTW10	-	none	653321	5545426	Regional	-	-	-	Monitor water quality to detect seepage downgradient of Dry Creek, Greenhills Operations, and Fording River Operations	Quarterly	Se, Cd, NO_3, SO_4
	Downgradient of Plant Site	RG_02-20	-	none	Private	Private	Regional	-	-	-	Monitor water quality to detect seepage downgradient of LCO Plant Site, Greenhills Operations, and Fording River Operations	Quarterly	Se, Cd, NO_3, SO_4

Notes:

m UTM = metres on Universal Transverse Mercator projection, zone 11; m/s = metres per second; mbgs = metres below ground surface; Se = selenium, Cd = cadmium, NO3 = nitrate, SO4 = sulphate; - = unknown or not applicable.

ENV EMS = Ministry of Environment and Climate Change Strategy EMS number

LCO = Line Creek Operations

Table 4-1: Groundwater Monitoring Locations with Chemistry Data for Process Plant Area and Downgradient Location

Area		Well Name	Sample Date	Nitrate, as N	Selenium (dissolved)	Sulphate	Cadmium (dissolved)
				mg/L	µg/L	mg/L	µg/L
Phase I - Process Plant	Coarse Coal Rejects	LC_PIZP1101	13-Jun-2013	< 0.0050	< 2.0	3.29	< 0.200
			26-Aug-2013	< 0.0050	< 0.10	5.41	< 0.010
			20-Dec-2013	0.0115	< 0.10	5.29	< 0.010
			12-Mar-2014	< 0.0050	< 0.10	4.65	< 0.010
			26-Jun-2014	< 0.0050	< 0.10	4.31	< 0.010
			24-Sep-2014	< 0.0050	< 0.10	3.86	< 0.010
			12-Dec-2014	< 0.0050	< 0.10	3.7	< 0.010
			14-Mar-2015	0.0072	< 0.10	3.5	< 0.010
			12-Jun-2015	0.0066	< 0.050	3.49	< 0.005
			24-Sep-2015	< 0.0050	< 0.050	3.49	< 0.005
			18-Dec-2015	< 0.0050	< 0.050	4.35	< 0.005
			15-Mar-2016	< 0.0050	< 0.050	3.83	<0.005
			17-Jun-2016	< 0.0050	< 0.050	4.14	<0.005
			15-Sep-2016	< 0.0050	< 0.25	3.5	<0.025
			12-Dec-2016	< 0.0050	< 0.25	3.62	<0.025
			15-Mar-2017	0.0074	< 0.050	3.44	< 0.0050
			13-Jun-2017	< 0.0050	< 0.050	2.97	0.0058
			21-Sep-2017	< 0.0050	< 0.050	2.7	< 0.0050
			3-Nov-2017	< 0.0050	< 0.25	2.84	0.075
			20-Mar-2018	< 0.0050	< 0.050	2.61	< 0.0050
			19-Jun-2018	0.0083	< 0.050	2.71	< 0.0050
			13-Sep-2018		< 0.050		0.0155
			16-Nov-2018	< 0.0050	< 0.050	2.58	0.0113
		LC_PIZP1103	12-Dec-2014	< 0.050	0.31	36.7	< 0.010
			13-Mar-2015	0.011	0.29	37.5	< 0.010
			12-Jun-2015	< 0.010	0.13	33.5	< 0.005
			23-Sep-2015	<0.025	<0.050	32.9	< 0.005
			14-Dec-2015	< 0.025	0.064	31.2	< 0.005
			15-Mar-2016	< 0.025	0.059	31.1	<0.005
			13-Jun-2016	0.036	< 0.050	33	0.0066
			12-Sep-2016	< 0.025	0.051	29.2	0.0119
			12-Dec-2016	0.0239	0.26	32.2	<0.025
			15-Mar-2017	0.062	< 0.050	30.5	0.0083
			13-Jun-2017	0.128	< 0.050	29.3	0.0214
			13-Sep-2017	0.144	< 0.050	29.4	0.0114
			31-Oct-2017	0.156	0.073	29	0.011
			6-Mar-2018	0.399	0.053	30.1	0.0184
			14-Jun-2018	< 0.40	0.051	31	0.0146
			21-Aug-2018	0.116	< 0.050	27.8	0.0114
			19-Nov-2018	0.159	< 0.050	30	0.0219
		LC_PIZP1104	11-Dec-2014	0.266	0.16	89.5	0.016
			13-Mar-2015	0.109	< 0.10	58.1	0.021
			11-Jun-2015	0.264	0.109	92.4	0.023
			24-Sep-2015	0.128	< 0.050	54	0.0326
			17-Dec-2015	0.303	0.101	89.4	0.0102
			17-Mar-2016	0.312	0.096	94.1	0.0188
			15-Jun-2016	0.288	0.107	86.2	0.0167
			14-Sep-2016	0.347	0.137	86.2	0.0146
			9-Dec-2016	0.348	0.33	81.4	<0.025
			23-Mar-2017	0.428	0.114	91.8	0.0212
			13-Jun-2017	0.431	0.342	97.1	0.0212
			20-Sep-2017	0.528	0.109	96.4	0.0124
			2-Nov-2017	0.574	0.119	80.6	0.0135
			13-Mar-2018	0.472	0.15	170	0.013
			15-Jun-2018	0.599	0.235	102	0.0113
			28-Nov-2018	0.491	0.113	85.8	0.0208
			28-Nov-2018 (Dup)	0.483	0.138	85.7	0.0228
		LC_PIZP1105	11-Dec-2014	< 0.050	0.21	49.7	0.041
			12-Mar-2015	0.044	0.2	60.4	0.026
			11-Jun-2015	0.065	0.502	58.6	0.03
			23-Sep-2015	0.048	0.434	60.4	0.0185
			17-Dec-2015	0.041	0.652	68.4	0.0215
			17-Mar-2016	0.035	0.657	75.3	0.0291
			15-Jun-2016	0.04	0.597	82.6	0.0251
			14-Sep-2016	0.034	0.773	83.2	0.0291
			16-Dec-2016	0.0323	0.64	78.1	0.027
			22-Mar-2017	0.07	0.521	80.4	0.0404
			16-Jun-2017	0.064	0.499	74.9	0.0511
			21-Sep-2017	0.074	0.406	124	0.0523
			2-Nov-2017	0.216	< 0.25	81.3	0.028
			20-Mar-2018	0.027	0.391	82.7	0.0358
			19-Jun-2018	0.083	0.37	102	0.061
			7-Sep-2018	0.045	0.411	184	0.0745
Non-LCO Monitoring Wells	Downgradient of Plant Site	RG_02-20	26-Mar-2014	3.36	**13.3 (Total)**	68.6	0.011 (Total)
			24-Apr-2014	3.36	**13.0 (Total)**	71.3	0.014 (Total)
			3-Jul-2014	3.69	**14.4 (Total)**	81.2	<0.01 (Total)
			24-Nov-2014	2.5	**10.0 (Total)**	59.6	<0.2 (Total)
			10-Mar-2015	2.97	**12.0 (Total)**	69.1	<0.2 (Total)
			26-Nov-2015	2.44	9.79 (Total)	60.2	0.0096 (Total)
			1-Jun-2016	3.62	**12.6 (Total)**	87.60	0.008 (Total)
			28-Jun-2016	3.26	**11.2 (Total)**	83.60	<0.005 (Total)
			14-Sep-2016	2.12	7.43 (Total)	59.9	0.0076 (Total)
			12-Dec-2016	2.19	8.54 (Total)	63.3	0.01 (Total)
			1-Mar-2017	2.75	9.5 (Total)	74.6	0.0097 (Total)
			29-May-2017	2.97	**10.2 (Total)**	74.8	0.0088 (Total)
			21-Aug-2017	1.81	7.56 (Total)	52.8	0.0071 (Total)
			15-Nov-2017	2.05	7.88 (Total)	56.5	0.0062 (Total)
			13-Feb-2018	2.73	**12.4 (Total)**	75.4	0.0086 (Total)
			25-Apr-2018	2.97	**13 (Total)**	78.9	0.0125 (Total)
			26-Sep-2018	2.08	9.6 (Total)	58.9	0.0086 (Total)
			26-Nov-2018	2.37	9.36 (Total)	63.9	0.0055 (Total)
Primary Screening: BC CSR Guidelines							
Aquatic Life (freshwater)		Maximum		400	20	4,290[c]	4[c]
Drinking Water		Maximum		10	10	500	5
Livestock		Maximum		100	30	1,000	80
Irrigation		Maximum		-	20[a], 50[b]	-	5
Secondary Screening: Permit Limits, Site Performance Objectives, and Canadian Guidelines							
Canadian Drinking Water Guideline		Maximum		Not applied	50	Not applied	Not applied
Elk Valley Effluent Permit Threshold Values: Permitted Discharge at LCO Compliance Point		Monthly Average		7	50	-	0.58
Elk Valley Effluent Permit Threshold Values: Site Performance Objective at Order Station EV_ER4		Maximum		4	23	429	0.24

BOLD	Concentration greater than BC CSR Drinking Water guideline.
ITALICS	Concentration greater than BC CSR Livestock guideline
INVERSE	Concentration greater than BC CSR Irrigation guideline

Comparisons of groundwater quality to water quality guidelines made for reference purposes only.
BC Contaminated Sites Regulations. BC MOE (1997) Generic Numerical Water Standards (Criteria). Accessed February 2019.
Canadian Drinking Water Guidelines: Health Canada (2017). Guidelines for Canadian Drinking Water Quality Summary Table.
Secondary screening applies only when primary screening yields an exceedance. Elk Valley Effluent Permit PE107517. Issued November 19, 2014.
LCO = Line Creek Operations
- = no guideline.
[a] = Standard for continuous applications on crops
[b] = Standard for intermittent application on crops
[c] = Hardness of 250 mg/L is assumed
(Dup) = Duplicate sample
µg/L = microgram per litre; mg/L = miligram per litre
Sampling Notes:
2018: LC_PIZP1104 had insufficient water levels for sample collection in Q3 (July to September).
2018: LC_PIZP1101 missing Nitrate and Sulphate results due to constraints in the field during sampling event (September 13, 2018)

Table 4-2: Groundwater Monitoring Locations with Chemistry Data for Dry Creek Area and Downgradient Location

Area		Well Name	Sample Date	Nitrate as N	Selenium (dissolved)	Sulphate	Cadmium (dissolved)
				mg/L	µg/L	mg/L	µg/L
Phase II - Dry Creek	Diversion Structure in Valley Bottom	LC_PIZDC1306	9-Jun-2015	0.176	3.24	6.53	0.113
			22-Sep-2015	0.08	2.96	6.67	0.103
			15-Dec-2015	0.0906	2.15	6.33	0.121
			16-Mar-2016	0.0702	1.53	6.01	0.0233
			10-Jun-2016	0.105	2.23	6.14	0.141
			13-Sep-2016	0.11	2.82	6.47	0.124
			12-Jun-2017	0.2	5.6	6.89	0.124
			14-Sep-2017	0.155	3.59	6.52	0.133
			1-Nov-2017	0.135	3.06	6	0.125
			25-Jun-2018	0.228	5.18	8.02	0.124
			23-Aug-2018	0.156	4.23	6.63	0.152
			23-Aug-2018 (Dup)	0.154	4.56	6.62	0.393
			26-Nov-2018	0.265	4.13	6.88	0.157
		LC_PIZDC1307	9-Dec-2014	< 0.0050	< 0.10	1.71	< 0.010
			10-Mar-2015	0.0073	< 0.10	0.44	< 0.010
			10-Jun-2015	< 0.0050	< 0.050	0.45	< 0.005
			22-Sep-2015	< 0.0050	0.053	< 0.30	< 0.005
			16-Dec-2015	< 0.0050	< 0.050	< 0.30	< 0.005
			16-Mar-2016	< 0.0050	< 0.050	< 0.30	<0.005
			10-Jun-2016	< 0.0050	< 0.050	< 0.30	<0.005
			13-Sep-2016	< 0.0050	< 0.050	< 0.30	<0.005
			13-Dec-2016	< 0.0050	< 0.25	< 0.30	<0.025
			16-Mar-2017	< 0.0050	< 0.050	< 0.30	0.0121
			12-Jun-2017	< 0.0050	< 0.050	< 0.30	0.0155
			19-Sep-2017	< 0.0050	< 0.050	< 0.30	< 0.015
			1-Nov-2017	0.0058	0.14	< 0.30	0.0337
			7-Mar-2018	< 0.0050	< 0.050	< 0.30	< 0.015
			13-Jun-2018	< 0.0050	< 0.050	< 0.30	< 0.030
			29-Aug-2018	< 0.0050	< 0.050	< 0.30	< 0.015
			26-Nov-2018	< 0.0050	< 0.050	< 0.30	< 0.010
		LC_PIZDC1308	9-Dec-2014	0.219	0.73	5.3	0.097
			10-Mar-2015	0.112	0.27	4.78	< 0.010
			10-Jun-2015	0.667	0.686	5.38	0.132
			22-Sep-2015	0.383	0.375	4.24	0.139
			16-Dec-2015	0.107	0.177	4.41	0.125
			16-Mar-2016	0.0082	< 0.050	3.23	< 0.005
			10-Jun-2016	0.258	0.317	5.11	0.161
			13-Sep-2016	0.0326	0.141	4.6	0.095
			13-Dec-2016	0.0432	< 0.25	5.09	0.17
			16-Mar-2017	0.0055	< 0.050	2.5	0.0091
			12-Jun-2017	0.159	0.301	4.74	0.133
			19-Sep-2017	< 0.0050	< 0.050	1.92	0.023
			1-Nov-2017	0.0627	< 0.050	1.84	0.0361
			7-Mar-2018 (Dup)	0.0052	< 0.050	2.1	< 0.005
			7-Mar-2018	< 0.0050	< 0.050	2.02	< 0.005
			13-Jun-2018	0.181	0.16	5.53	0.116
			29-Aug-2018	0.0383	0.098	5	0.127
			27-Nov-2018	< 0.0050	0.058	5.1	0.0211
		LC_PIZDC1404S	9-Dec-2014	< 0.0050	< 0.10	8.74	< 0.010
			9-Mar-2015	< 0.0050	< 0.10	8.3	< 0.010
			9-Jun-2015	< 0.0050	< 0.050	5.79	< 0.005
			22-Sep-2015	< 0.0050	< 0.050	5.5	< 0.005
			15-Dec-2015	< 0.0050	< 0.050	5.52	< 0.005
			16-Mar-2016	< 0.0050	< 0.050	5.31	<0.005
			10-Jun-2016	< 0.0050	< 0.050	5.22	<0.005
			13-Sep-2016	0.0134	< 0.050	5.85	<0.005
			13-Dec-2016	0.0061	< 0.25	5.36	<0.025
			16-Mar-2017	0.0471	< 0.050	5.28	< 0.0050
			12-Jun-2017	0.0078	< 0.050	4.64	< 0.0050
			14-Sep-2017	0.0311	< 0.050	4.82	< 0.0050
			1-Nov-2017	< 0.0050	< 0.050	4.68	< 0.0050
			6-Mar-2018	< 0.0050	< 0.050	4.34	< 0.0050
			11-Jun-2018	< 0.0050	< 0.050	< 0.30	0.0138
			11-Jun-2018 (Dup)	< 0.0050	< 0.050	< 0.30	< 0.0050
			20-Aug-2018	< 0.0050	< 0.050	5.13	< 0.0050
			14-Nov-2018	< 0.0050	< 0.050	4.95	< 0.0050
		LC_PIZDC1404D	9-Mar-2015	0.01	< 0.10	< 0.60	< 0.010
			9-Jun-2015	< 0.010	< 0.050	< 0.60	< 0.005
			22-Sep-2015	< 0.025	< 0.050	< 1.5	< 0.005
			15-Dec-2015	< 0.025	< 0.050	< 1.5	< 0.005
			16-Mar-2016	< 0.025	< 0.050	< 1.5	<0.005
			10-Jun-2016	< 0.025	< 0.050	< 1.5	0.0071
			13-Sep-2016	< 0.025	< 0.050	< 1.5	<0.005
			13-Dec-2016	< 0.0050	0.41	0.44	<0.025
			16-Mar-2017	< 0.0050	< 0.050	0.5	0.0061
			12-Jun-2017	< 0.0050	< 0.050	< 0.30	0.008
			14-Sep-2017	< 0.0050	< 0.050	< 0.30	< 0.0050
			1-Nov-2017	< 0.0050	< 0.050	< 0.30	0.0064
			6-Mar-2018	< 0.0050	0.11	0.84	0.006
			11-Jun-2018	< 0.0050	< 0.050	4.44	< 0.0050
			23-Aug-2018	< 0.025	< 0.050	< 1.5	0.0184
			14-Nov-2018	< 0.0050	< 0.050	< 0.30	0.0064
		LC_PIZDC0901	28-Aug-2013	0.213	< 0.50	3.29	0.053
			19-Dec-2013	0.25	0.57	3.5	0.091
			11-Mar-2014	0.0243	0.31	4.87	0.065
			26-Jun-2014	0.298	0.37	3.4	0.066
			23-Sep-2014	0.689	4.76	11.5	0.068
			10-Dec-2014	1.24	0.9	8.31	<0.2 (Total)
			11-Mar-2015	3.9	2.18	12.9	0.047
			10-Jun-2015	8.1	1.76	17.6	0.0791
			22-Sep-2015	4.85	0.275	15.1	0.128
			15-Dec-2015	2.67	1.34	14.2	0.0767
			16-Mar-2016	1.87	1.74	17.8	0.0327
			10-Jun-2016	1.23	1.9	15.7	0.116
			13-Sep-2016	0.685	1.85	12.8	0.0395
			15-Dec-2016	0.575	0.99	11.9	0.068
			16-Mar-2017	0.189	2.56	10.7	0.0427
			12-Jun-2017	0.39	0.513	10.5	0.0983
			19-Sep-2017	0.166	0.476	12.4	0.107
			7-Mar-2018	0.105	2.46	11.8	0.0777
			18-Jun-2018	0.351	2.29	18.8	0.0633
			23-Aug-2018	0.0751	0.867	17.2	0.106
			18-Dec-2018	0.0165	1.43	18.3	0.139
Non-LCO Monitoring Wells	Downgradient of Dry Creek	GH_POTW10	6-Jun-2012	0.196	2.71 (Total)	180	0.01 (Total)
			5-Dec-2012	0.366	3.92 (Total)	187	0.01 (Total)
			9-Oct-2013	0.495	3.95 (Total)	192	0.01 (Total)
			1-May-2014	0.89	5.78 (Total)	194	0.012 (Total)
			8-Oct-2014	0.482	3.95 (Total)	189	0.01 (Total)
			8-Jun-2015	0.405	3.72 (Total)	196	0.0054 (Total)
			4-Nov-2015	0.493	3.7 (Total)	190	0.0052 (Total)
			7-Mar-2016	0.705	4.62 (Total)	191	0.0061 (Total)
			14-Jun-2016	0.445	3.35 (Total)	200	0.0052 (Total)
			16-Aug-2016	0.391	2.93 (Total)	186	0.0067 (Total)
			17-Nov-2016	0.478	3.73 (Total)	185	0.0094 (Total)
			7-Feb-2017	0.675	4.39 (Total)	182	0.0055 (Total)
			19-Jun-2017	< 0.025	0.119 (Total)	278	0.0188 (Total)
			25-Sep-2017	0.453	3.06 (Total)	191	0.0085 (Total)
			16-Nov-2017	0.448	3.92 (Total)	195	0.01 (Total)
			6-Mar-2018	0.591	4.56 (Total)	193	0.0062 (Total)
			11-Jun-2018	0.269	2.66 (Total)	198	0.0062 (Total)
			29-Aug-2018 (Dup)	0.294	2.55 (Total)	188	0.0085 (Total)
			29-Aug-2018	0.295	2.69 (Total)	188	0.0096 (Total)
			4-Oct-2018	0.369	2.74 (Total)	191	0.0105 (Total)
Primary Screening: BC CSR Guidelines							
Aquatic Life (freshwater)		Maximum		400	20	4,290[c]	4[c]
Drinking Water		Maximum		10	10	500	5
Livestock		Maximum		100	30	1000	80
Irrigation		Maximum		-	20[a], 50[b]	-	5
Secondary Screening: Permit Limits, Site Performance Objectives, and Canadian Guidelines							
Canadian Drinking Water Guideline		Maximum		Not applied	50	Not applied	Not applied
Elk Valley Effluent Permit Threshold Values: Permitted Discharge at LCO Compliance Point		Monthly Average		7	50	-	0.58
Elk Valley Effluent Permit Threshold Values: Site Performance Objective at Order Station GH_FR1		Maximum		20	63	429	0.39

BOLD	Concentration greater than BC CSR Aquatic Life and Drinking Water guideline.
ITALICS	Concentration greater than BC CSR Livestock guideline
UNDERLINE	Concentration greater than BC CSR Irrigation guideline

Comparisons of groundwater quality to water quality guidelines made for reference purposes only.
BC Contaminated Sites Regulations: BC MOE (1997) Generic Numerical Water Standards (Criteria), Accessed February 2019.
Canadian Drinking Water Guidelines: Health Canada (2017), Guidelines for Canadian Drinking Water Quality Summary Table.
Secondary screening applies only when primary screening yields an exceedance. Elk Valley Effluent Permit PE107517, Issued November 19, 2014.
LCO = Line Creek Operations
- = no guideline.
[a] = Standard for continuous applications on crops
[b] = Standard for intermittent application on crops
[c] = Hardness of 250 mg/L is assumed
(Dup) = Duplicate sample
ug/L = microgram per litre; mg/L = miligram per litre
Sampling Notes:
2018: LC_PIZDC1306 could not be sampled in Q1 (January to March) due to frozen conditions.

Appendix II-4: Elkview Operations 2018 Site-Specific Groundwater Monitoring Program

Summary

SNC-Lavalin completed the 2018 Annual Report for the EVO SSGMP (SNC-Lavalin, 2019c). The following information was taken from the 2018 EVO Annual Report.

Hydrogeology in the conceptual site model (CSM) was described in terms of main stem valley-bottoms including the Elk River and Michel Creek and major tributary drainages including Grave Creek/Harmer Creek, which flow into the Elk River and Erickson Creek, which flows into Michel Creek.

The EVO SSGMP includes a total of 12 monitoring wells which are monitored and sampled quarterly for a specific list of analytes. The wells monitored and sampled as part of the 2018 annual program are shown on Drawing 662790-002, attached. A summary of wells included in each drainage area is provided in Table 1; manual water level measurements provided in Table 2; field parameters in Table 3; and analytical results compared to screening criteria in Tables 4 and 5. Analytical results for select constituents of interest (CI), including nitrate-nitrogen, sulphate and dissolved selenium, are shown on Drawings 662790-008 to -010, attached.

A summary of the 2018 Annual Report for the EVO SSGMP is as follows:

- In 2018, quarterly sampling and monitoring was conducted at all wells according to the EVO SSGMP with no modifications or exceptions. Recommendations from the 2017 SSGMP Annual report (SNC-Lavalin, 2018a) were implemented resulting in improved quality of data collected. Manual groundwater levels were recorded before sampling and were closely aligned with the continuous water level measurements. In addition, samples were delivered to the laboratory for analysis promptly to avoid hold time exceedances due to shipping and handling errors.
- The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report. Detectable concentrations of select parameters in trip and field blanks were marginally above the DL (for the most part) and all below applicable primary screening criteria so did not affect the reliability of the data.
- Review of continuous groundwater elevation data indicated a seasonal trend with higher groundwater levels recorded in spring months. Maximum groundwater elevations in wells EV_LSgw, EV_OCgw, and EV_ECgw were slightly lower than spring 2017 although similar to 2015 and 2016. In contrast, maximum groundwater elevations in all other wells were similar to spring 2017 levels and higher than spring 2015 and 2016.

Groundwater quality in 2018 was similar to previous years, with notable conclusions listed below by drainage.

- **Grave Creek / Harmer Creek**: groundwater samples at EV_GV3gw were below primary screening criteria for all CI. Limited interactions between the deeper aquifer and surface water occur in the drainage and groundwater transport of CI was inferred to be minimal.

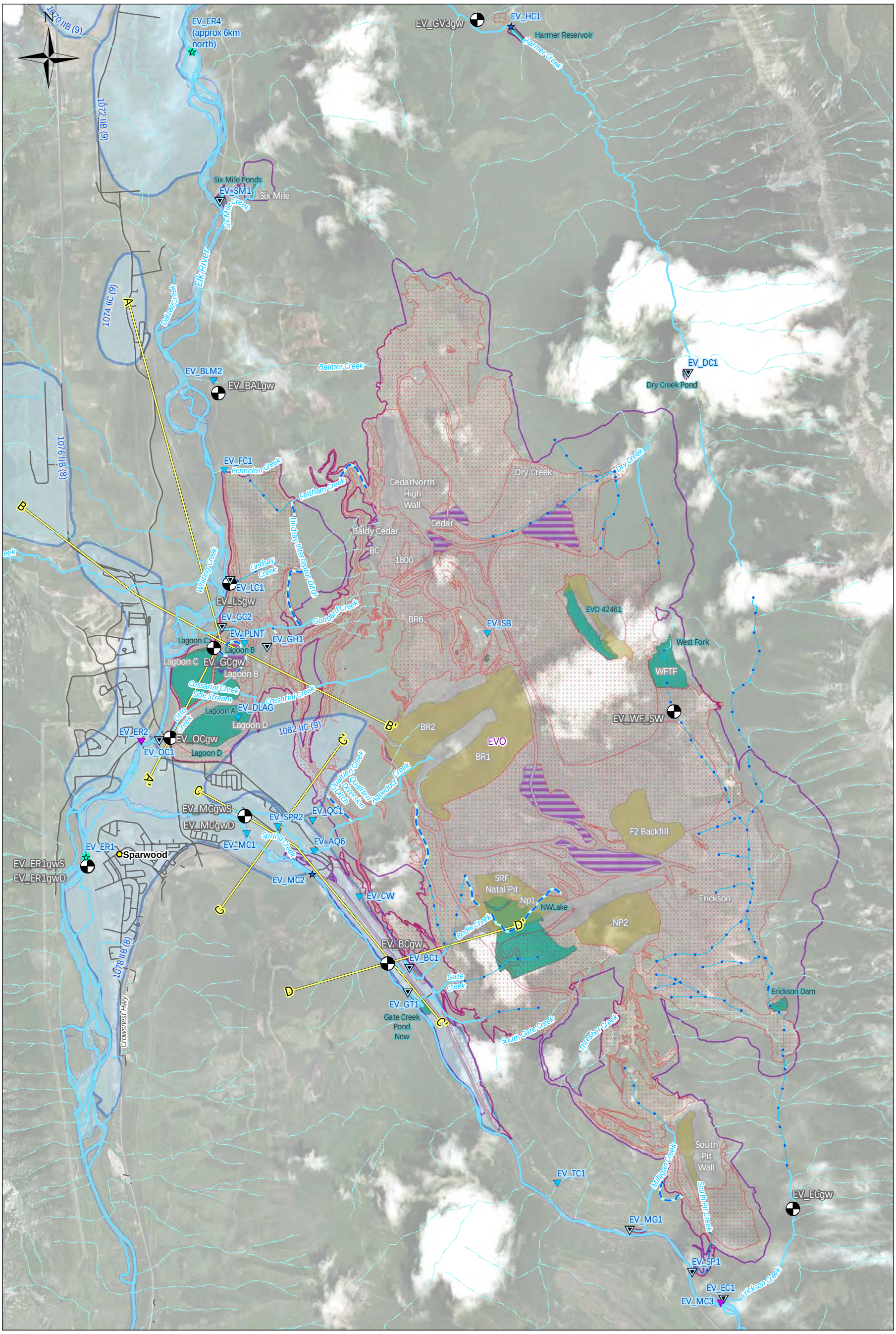
- **Elk River proximal to EVO**: groundwater samples at EV_BALgw, EV_LSgw, EV_GCgw and EV_OCgw were below primary screening criteria for all CI. This contrasts with concentrations in tributary surface water originating from the western slope of EVO, indicating the main pathway for mine-influenced water to the valley bottom is through surface water and not a down-valley groundwater transport pathway from upstream areas in the Elk River valley.
- **Erickson Creek**: groundwater samples at EV_ECgw and EV_WF_SW were below primary screening criteria for all CI. Similar to the other drainages, the main transport pathway of mine-influenced water in the Erickson Creek drainage appears to be through surface water. Therefore, mine-influence to groundwater in the Michel Creek valley bottom will be predominantly through infiltration of Erickson Creek.
- **Michel Creek**: groundwater samples at EV_BCgw were above primary and secondary screening criteria for dissolved selenium, with groundwater samples from EV_MCgwS/D below primary screening criteria for CI. Concentrations of selenium, nitrate and sulphate in groundwater at EV_BCgw were typically lower compared to concentrations in adjacent tributary surface water from Gate Creek and Bodie Creek, and higher compared to nearby Michel Creek. This suggests that a localized groundwater transport pathway of CI exists in the vicinity of EV_BCgw.
- **Elk River distal to EVO**: groundwater samples at EV_ER1gwS/D were marginally above primary screening criteria. Additional analysis and discussion will be provided in the upcoming RGMP annual report.

A number of constituents other than CI were measured above primary screening criteria, including fluoride, manganese, lithium and molybdenum. These are inferred to originate from natural sources (e.g., interaction with bedrock/unconsolidated materials or reducing conditions).

Recommendations

Based on review of data collected in 2018 for the EVO SSGMP, SNC-Lavalin has the following recommendations for future groundwater monitoring and sampling programs:

- Ensure field and trip blanks are analysed for the same parameters to provide comprehensive comparisons;
- Ensure all parameters stabilize before sampling and avoid sampling if bubbles present in tubing;
- Ensure dataloggers are reinstalled after each sampling event to the specified depth. Reviewing data after each datalogger download would identify errors and allow for timely correction;
- Remove the nested well EV_ER1gwS/D from the SSGMP and transition to RGMP as indicated in the 2018 SSGMP Update (SNC-Lavalin, 2018c);
- Evaluate whether newly-installed groundwater monitoring wells in the Michel Creek Valley should be included in SSGMP monitoring; and,
- Once approved, implement the 2018 SSGMP Update.



Legend

Groundwater Stations
- Monitoring Well

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- River Bed
- Mapped Aquifers

Site Features
- Geological Cross Sections
- Pit
- Stockpiles
- Waste Dump
- EVO Permitted Boundary
- Highway
- Secondary Road
- Tailings/Settling Pond
- Reservoir

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Information provided by Teck Coal Ltd.
2. Mapped Aquifers are from Water Resources Atlas (BC ENV)

Revisons:
0 - AO - 2019-01-29 - DRAFT - SH

0 0.3 0.6 1.2 1.8 2.4 3 km

PROJECT LOCATION: Elkview Operations, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

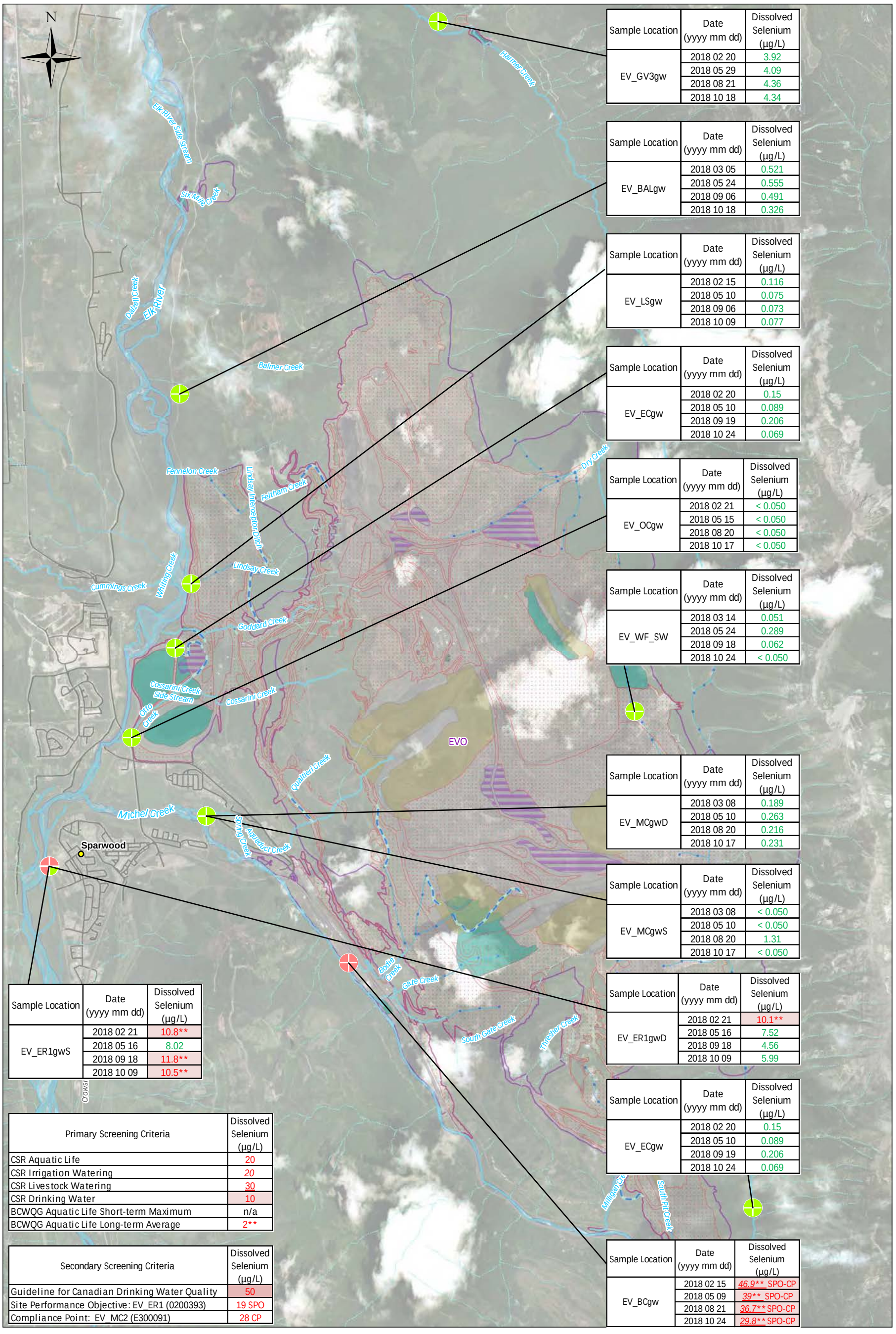
Site Features and Sample Location Plan

CHK'D: SH | DATE: 2019/02/07 | SCALE: 1:50,000 | 622790-002 | REV: 0

BY: AO | COORD SYS: NAD 1983 UTM Zone 11N

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\662790_EVO_SSGMP\662790-002_SiteFeaturesSampLocPlan.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\662790_EVO_SSGMP



Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_GV3gw	2018 02 20	3.92
	2018 05 29	4.09
	2018 08 21	4.36
	2018 10 18	4.34

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_BALgw	2018 03 05	0.521
	2018 05 24	0.555
	2018 09 06	0.491
	2018 10 18	0.326

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_LSgw	2018 02 15	0.116
	2018 05 10	0.075
	2018 09 06	0.073
	2018 10 09	0.077

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_ECgw	2018 02 20	0.15
	2018 05 10	0.089
	2018 09 19	0.206
	2018 10 24	0.069

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_OCgw	2018 02 21	< 0.050
	2018 05 15	< 0.050
	2018 08 20	< 0.050
	2018 10 17	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_WF_SW	2018 03 14	0.051
	2018 05 24	0.289
	2018 09 18	0.062
	2018 10 24	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_MCgwD	2018 03 08	0.189
	2018 05 10	0.263
	2018 08 20	0.216
	2018 10 17	0.231

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_MCgwS	2018 03 08	< 0.050
	2018 05 10	< 0.050
	2018 08 20	1.31
	2018 10 17	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_ER1gwD	2018 02 21	10.1**
	2018 05 16	7.52
	2018 09 18	4.56
	2018 10 09	5.99

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_ER1gwS	2018 02 21	10.8**
	2018 05 16	8.02
	2018 09 18	11.8**
	2018 10 09	10.5**

Sample Location	Date (yyyy mm dd)	Dissolved Selenium (µg/L)
EV_BCgw	2018 02 15	46.9** SPO-CP
	2018 05 09	39** SPO-CP
	2018 08 21	36.7** SPO-CP
	2018 10 24	29.8** SPO-CP

Primary Screening Criteria	Dissolved Selenium (µg/L)
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10
BCWQG Aquatic Life Short-term Maximum	n/a
BCWQG Aquatic Life Long-term Average	2**

Secondary Screening Criteria	Dissolved Selenium (µg/L)
Guideline for Canadian Drinking Water Quality	50
Site Performance Objective: EV_ER1 (0200393)	19 SPO
Compliance Point: EV_MC2 (E300091)	28 CP

Legend

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil

Site Features
- EVO Permitted Boundary
- Tailings/Settling Pond
- Reservoir
- River Bed

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Ltd.

Revisons:
0 - AO - 2019-01-29 - DRAFT - KM

0 0.5 1 2 3 km

PROJECT LOCATION: Elk Valley Operations, BC

CLIENT NAME: Teck Coal Ltd.

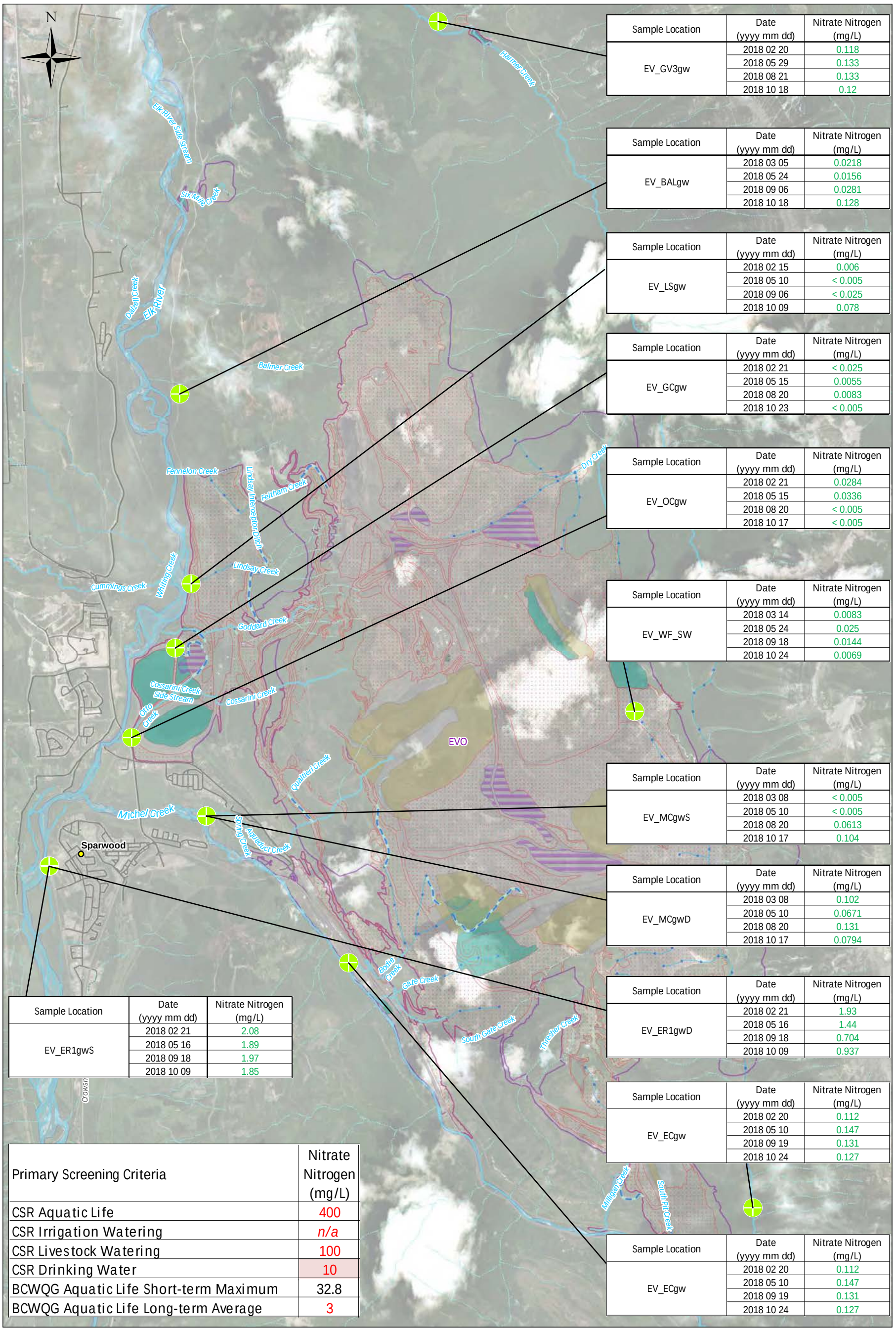
SNC·LAVALIN

Spatial Distribution of Selenium in Groundwater

CHK'D: KM | BY: AO | DATE: 2019/02/26 | SCALE: 1:50,000 | COORD SYS: NAD 1983 UTM Zone 11N | Ref Num: 622790-008 | REV: 0

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\662790_EVO_SSGMP\662790-008_ConsitinGW_EVO_Sel.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\662790_EVO_SSGMP



Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_GV3gw	2018 02 20	0.118
	2018 05 29	0.133
	2018 08 21	0.133
	2018 10 18	0.12

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_BALgw	2018 03 05	0.0218
	2018 05 24	0.0156
	2018 09 06	0.0281
	2018 10 18	0.128

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_LSgw	2018 02 15	0.006
	2018 05 10	< 0.005
	2018 09 06	< 0.025
	2018 10 09	0.078

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_GCgw	2018 02 21	< 0.025
	2018 05 15	0.0055
	2018 08 20	0.0083
	2018 10 23	< 0.005

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_OCgw	2018 02 21	0.0284
	2018 05 15	0.0336
	2018 08 20	< 0.005
	2018 10 17	< 0.005

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_WF_SW	2018 03 14	0.0083
	2018 05 24	0.025
	2018 09 18	0.0144
	2018 10 24	0.0069

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_MCgwS	2018 03 08	< 0.005
	2018 05 10	< 0.005
	2018 08 20	0.0613
	2018 10 17	0.104

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_MCgwD	2018 03 08	0.102
	2018 05 10	0.0671
	2018 08 20	0.131
	2018 10 17	0.0794

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_ER1gwS	2018 02 21	2.08
	2018 05 16	1.89
	2018 09 18	1.97
	2018 10 09	1.85

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_ER1gwD	2018 02 21	1.93
	2018 05 16	1.44
	2018 09 18	0.704
	2018 10 09	0.937

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_ECgw	2018 02 20	0.112
	2018 05 10	0.147
	2018 09 19	0.131
	2018 10 24	0.127

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen (mg/L)
EV_ECgw	2018 02 20	0.112
	2018 05 10	0.147
	2018 09 19	0.131
	2018 10 24	0.127

Primary Screening Criteria	Nitrate Nitrogen (mg/L)
CSR Aquatic Life	400
CSR Irrigation Watering	*n/a*
CSR Livestock Watering	100
CSR Drinking Water	10
BCWQG Aquatic Life Short-term Maximum	32.8
BCWQG Aquatic Life Long-term Average	3

Legend

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil

Site Features
- EVO Permitted Boundary
- Tailings/Settling Pond
- Reservoir
- River Bed

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Ltd.

Revisons:
0 - AO - 2019-01-29 - DRAFT - KM

0 0.5 1 2 3 km

PROJECT LOCATION: Elk Valley Operations, BC

CLIENT NAME: Teck Coal Ltd.

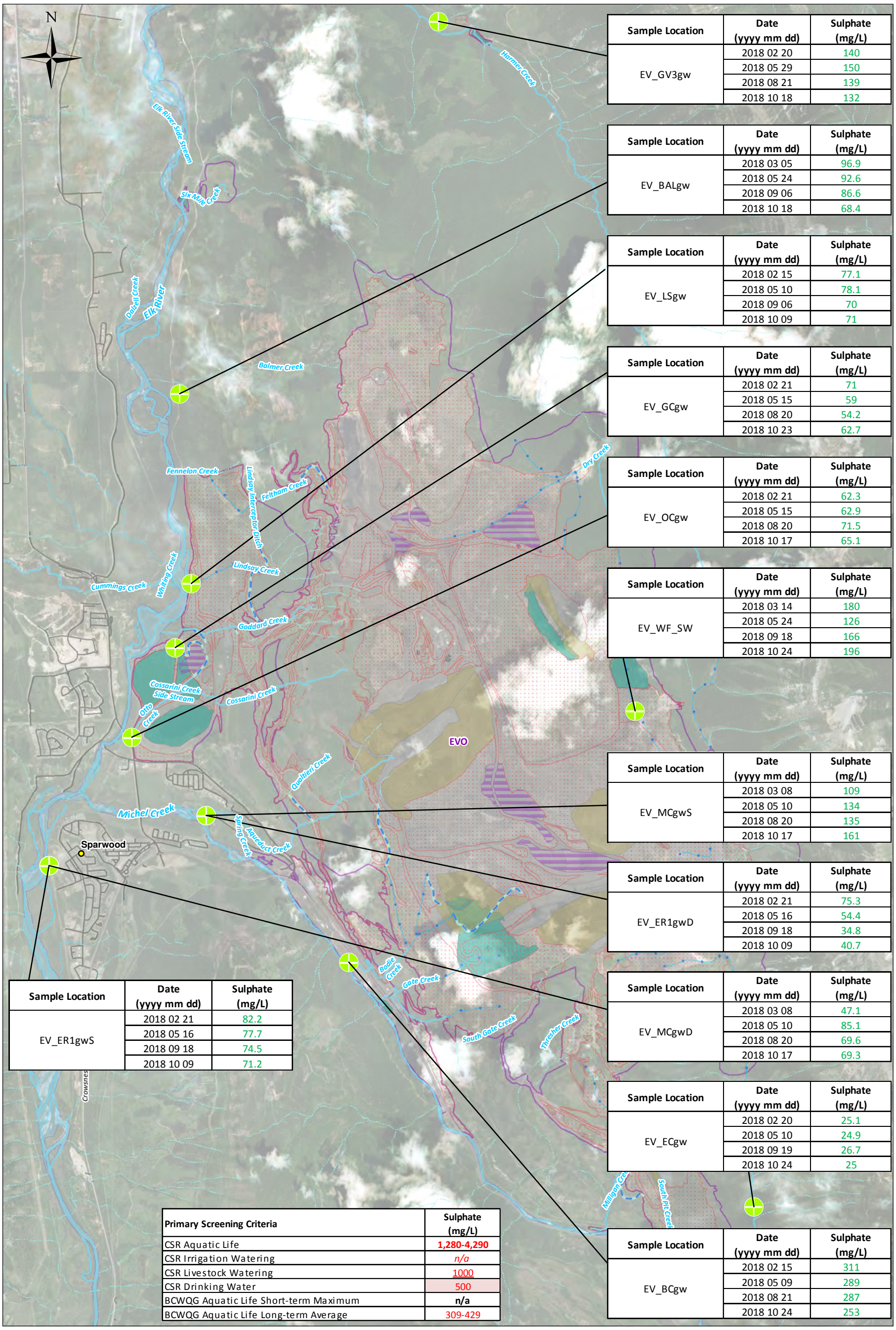
SNC·LAVALIN

Spatial Distribution of Dissolved Nitrate Nitrogen in Groundwater

CHK'D: KM | DATE: 2019/02/26 | SCALE: 1:50,000 | Ref Num: REV: 0
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | 622790-009

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\662790_EVO_SSGMP

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\662790_EVO_SSGMP\662790-009_ConsitinGW_EVO_Nit.mxd



Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_GV3gw	2018 02 20	140
	2018 05 29	150
	2018 08 21	139
	2018 10 18	132

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_BALgw	2018 03 05	96.9
	2018 05 24	92.6
	2018 09 06	86.6
	2018 10 18	68.4

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_LSgw	2018 02 15	77.1
	2018 05 10	78.1
	2018 09 06	70
	2018 10 09	71

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_GCgw	2018 02 21	71
	2018 05 15	59
	2018 08 20	54.2
	2018 10 23	62.7

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_OCgw	2018 02 21	62.3
	2018 05 15	62.9
	2018 08 20	71.5
	2018 10 17	65.1

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_WF_SW	2018 03 14	180
	2018 05 24	126
	2018 09 18	166
	2018 10 24	196

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_MCgwS	2018 03 08	109
	2018 05 10	134
	2018 08 20	135
	2018 10 17	161

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_ER1gwD	2018 02 21	75.3
	2018 05 16	54.4
	2018 09 18	34.8
	2018 10 09	40.7

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_ER1gwS	2018 02 21	82.2
	2018 05 16	77.7
	2018 09 18	74.5
	2018 10 09	71.2

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_MCgwD	2018 03 08	47.1
	2018 05 10	85.1
	2018 08 20	69.6
	2018 10 17	69.3

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_ECgw	2018 02 20	25.1
	2018 05 10	24.9
	2018 09 19	26.7
	2018 10 24	25

Sample Location	Date (yyyy mm dd)	Sulphate (mg/L)
EV_BCgw	2018 02 15	311
	2018 05 09	289
	2018 08 21	287
	2018 10 24	253

Primary Screening Criteria	Sulphate (mg/L)
CSR Aquatic Life	1,280-4,290
CSR Irrigation Watering	*n/a*
CSR Livestock Watering	1000
CSR Drinking Water	500
BCWQG Aquatic Life Short-term Maximum	n/a
BCWQG Aquatic Life Long-term Average	309-429

Legend

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil

Site Features
- EVO Permitted Boundary
- Tailings/Settling Pond
- Reservoir
- River Bed

Q4 Q1 Q3 Q2

Green below the applicable screening criteria
Red above the applicable screening criteria

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Ltd.

Revisons:
0 - AO - 2019-01-29 - DRAFT - KM

0 0.5 1 2 3 km

PROJECT LOCATION: Elk Valley Operations, BC

CLIENT NAME: Teck Coal Ltd.

SNC·LAVALIN

Spatial Distribution of Dissolved Sulphate in Groundwater

CHK'D: KM	DATE: 2019/02/27	SCALE: 1:50,000	Ref Num: 622790-010 REV: 0
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\662790_EVO_SSGMP

MXD Path: P:\Current Projects\Teck Coal Ltd\GIS\Map Series\662790_EVO_SSGMP\662790-010_ConsitinGW_EVO_Sul.mxd

TABLE 1: Summary of Groundater Monitoring Program Locations

Drainage	Well ID	Monitoring Program	Well Type	Coordinates (UTM NAD 83)		LIDAR Ground Elevation	Ground Elevation	TOC Elevation	Stick Up Height	Drilled Depth	Well Diameter	Top of Screen Depth	Bottom of Screen Depth	Screened Interval	Depth to Bedrock	Hydraulic Conductivity
				Easting	Northing	masl	masl	masl	m	mbgs	mm	mbgs	mbgs		mbgs	m/s
Grave Creek / Harmer Creek	EV_GV3gw	SSGMP, RGMP	Monitoring	656580	5522255	1307.01	-	1307.96	0.91	25.0	60	22.85	24.38	Silty Gravel	-	-
Elk River Proximal to EVO	EV_BALgw	SSGMP	Monitoring	653121	5517271	1180.75	1181.00	1182.00	1.00	12.7	60	10.50	12.70	Bedrock	10.4	-
	EV_LSgw	SSGMP, RGMP	Monitoring	653274	5514731	1133.05	1133.00	1133.93	0.93	10.7	60	5.18	6.71	Sand and Gravel	-	1.0E-03
	EV_GCgw	SSGMP	Monitoring	653061	5513870	1131.68	1131.24	1131.96	0.72	15.6	60	12.55	15.60	Silty Clay	-	4.0E-06
	EV_OCgw	SSGMP, RGMP	Monitoring	652480	5512671	1125.48	1126.00	1126.89	0.89	15.5	60	11.58	14.63	Sand	14.5	7.0E-07
Erickson Creek	EV_WF_SW	SSGMP	Monitoring	659208	5513023	1694.31	1679.25	1678.57	0.68	163	152	151.5	159.4	Waste Rock[1]	-	-
	EV_ECgw	SSGMP, RGMP	Monitoring	660795	5506384	1327.17	1327.00	1327.74	0.74	11.0	60	2.59	4.12	Sand/Clay and Sand	-	1.0E-08
Michel Creek	EV_MCgwS	SSGMP, RGMP	Monitoring	653476	5511624	1131.04	1131.00	1131.96	0.96	10.7	60	5.79	7.32	Clayey Silt	-	7.0E-08
	EV_MCgwD	SSGMP, RGMP	Monitoring	653476	5511624	1131.04	1131.00	1131.84	0.84	47.6	60	24.50	27.55	Sand and Clay	-	3.0E-06
	EV_BCgw	SSGMP, RGMP	Monitoring	655381	5509659	1153.15	1153.00	1153.86	0.86	23.2	60	17.77	20.82	Gravel	-	1.0E-04
Elk River Distal to EVO	EV_ER1gwS	SSGMP, RGMP	Monitoring	651374	5510955	1114.41	1115.25	1115.96	0.71	17.6	60	14.56	17.61	Sand and Gravel	-	7.0E-04
	EV_ER1gwD	SSGMP, RGMP	Monitoring	651379	5510952	1114.35	1115.20	1115.91	0.71	30.8	60	25.82	28.87	Sand/Silty Sand	27.9	9.0E-04

1) AMEC (2011) reported waste rock in the screened interval which is not clear in the borehole log (provided in Appendix I).

masl = metres above sea level
mbgs = metres below ground surface

TABLE 2: Summary of Groundwater Elevations and Calculated Vertical Gradients

Drainage	Well ID	LIDAR Ground Elevation	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Water Level Elevation	Well Pair	Date of Static Water Level Measurement	Calculated Vertical Gradient
		masl	masl	masl	m	yyyy/mm/dd	mtoc	masl		yyyy/mm/dd	m/m
Grave Creek / Harmer Creek	EV_GV3gw	1307.01	-	1307.96	0.91	2018/02/20	10.97	1296.99			
						2018/05/29	10.62	1297.34			
						2018/08/21	10.93	1297.03			
						2018/10/18	10.98	1296.99			
Elk River Proximal to EVO	EV_BALgw	1180.75	1181.00	1182.00	1.00	2018/03/05	12.10	1169.90			
						2018/05/24	11.98	1170.02			
						2018/09/06	12.04	1169.96			
						2018/10/18	12.05	1169.95			
	EV_LSgw	1133.05	1133.00	1133.93	0.93	2018/02/15	4.32	1129.61			
						2018/05/10	3.75	1130.18			
						2018/09/06	4.44	1129.49			
						2018/10/09	4.48	1129.45			
	EV_GCgw	1131.68	1131.24	1131.96	0.72	2018/02/21	2.67	1129.29			
						2018/05/15	2.11	1129.85			
						2018/08/20	2.64	1129.33			
						2018/10/23	2.63	1129.33			
	EV_OCgw	1125.48	1126.00	1126.89	0.89	2018/02/21	3.82	1123.07			
						2018/05/15	3.54	1123.35			
						2018/08/20	3.66	1123.24			
						2018/10/17	3.49	1123.40			
Erickson Creek	EV_WF_SW	1694.31	1679.25	1678.57	0.68	2018/03/14	147.60	1530.97			
						2018/05/24	138.44	1540.13			
						2018/09/18	144.50	1534.07			
						2018/10/24	144.86	1533.71			
	EV_ECgw	1327.17	1327.00	1327.74	0.74	2018/02/20	0.66	1327.08			
						2018/05/10	1.40	1326.34			
						2018/09/19	2.16	1325.58			
						2018/10/24	2.38	1325.36			
Michel Creek	EV_MCgwS	1131.04	1131.00	1131.96	0.96	2018/03/08	2.95	1129.02	EV_MCgwS and EV_MCgwD	2018/03/08	-0.031
						2018/05/10	1.75	1130.21		2018/05/10	-0.041
						2018/08/20	3.21	1128.76		2018/08/20	-0.039
						2018/10/17	3.10	1128.86		2018/10/17	-0.042
	EV_MCgwD	1131.04	1131.00	1131.84	0.84	2018/03/08	3.45	1128.39			
						2018/05/10	2.45	1129.39			
						2018/08/20	3.87	1127.98			
						2018/10/17	3.83	1128.01			
	EV_BCgw	1153.15	1153.00	1153.86	0.86	2018/02/15	2.94	1150.92			
						2018/05/09	2.10	1151.76			
						2018/08/21	3.14	1150.72			
						2018/10/24	3.25	1151.37			
Elk River Distal to EVO	EV_ER1gwS	1114.41	1115.25	1115.96	0.71	2018/02/21	5.32	1110.64	EV_ER1gwS and EV_ER1gwD	2018/02/21	0.022
						2018/05/16	3.86	1112.10		2018/05/16	0.025
						2018/09/18	5.24	1110.72		2018/09/18	0.032
						2018/10/09	5.32	1110.64		2018/10/09	0.025
	EV_ER1gwD	1114.35	1115.20	1115.91	0.71	2018/02/21	5.02	1110.89			
						2018/05/16	3.53	1112.38			
						2018/09/18	4.83	1111.08			
						2018/10/09	4.99	1110.92			

masl = metres above sea level
mbgs = metres below ground surface

TABLE 3: Field Measured Parameters

Sample Location	Sample Date (yyyy mm dd)	Field Parameters				
		pH pH	Temperature °C	Conductivity µS/cm	ORP mV	Dissolved Oxygen mg/L
Grave Creek / Harmer Creek						
EV_GV3gw	2018 02 20	7.75	1.8	629	94.5	3.38
	2018 05 29	7.53	6.6	635	258.2	3.37
	2018 08 21	7.5	8.2	645	78.7	2.97
	2018 10 18	7.4	6.1	631	81.9	2.56
Elk River Proximal to EVO						
EV_BALgw	2018 03 05	7.26	5.3	769	187.4	0.95
	2018 05 24	7.11	15	779	29.7	0.86
	2018 09 06	7.07	8.26	765	-54.7	1.37
	2018 10 18	7.16	9.1	754	31.3	1.21
EV_LSgw	2018 02 15	7.47	5.6	951	47.1	0.35
	2018 05 10	7.22	8.8	1,034	-20.6	0.3
	2018 09 06	7.14	12.4	1,147	-71.5	0.15
	2018 10 09	7.29	11.6	1,063	-85.2	0.39
EV_GCgw	2018 02 21	7.15	2.31	406	29.7	0.84
	2018 05 15	7.51	13.86	442	-103.7	0.41
	2018 08 20	7.52	14	446.8	-110.1	0.29
	2018 10 23	7.62	8.8	444.4	-62.2	0.24
EV_OCgw	2018 02 21	7.7	4.91	451	-30.1	1.34
	2018 05 15	7.28	9.47	477	-127.6	0.53
	2018 08 20	7.83	10.4	502	-146.9	0.35
	2018 10 17	7.96	8.6	747.2	-149.3	0.21
Erickson Creek						
EV_WF_SW	2018 03 14	7.69	5.1	489.9	50.5	1.27
	2018 05 24	8.94	16.2	359.2	161.8	1.61
	2018 09 18	8.92	9.20	402.20	51.50	2.44
	2018 10 24	8.95	9.5	434.3	-29.3	1.72
EV_ECgw	2018 02 20	7.57	1.20	412.30	245.60	1.87
	2018 05 10	7.57	5.40	410.30	165.70	2.12
	2018 09 19	7.17	13.05	435.00	207.50	3.35
	2018 10 24	7.53	6.8	410.6	107.4	2.15
Michel Creek						
EV_MCgwS	2018 03 08	7.29	2.7	852	-76	0.65
	2018 05 10	7.28	7.2	898	-83.1	0.33
	2018 08 20	7.1	9.7	865	-110.9	0.53
	2018 10 17	7.35	7.9	866	-86.5	0.34
EV_MCgwD	2018 03 08	8.23	2.8	535	208.8	14.28
	2018 05 10	7.56	10.8	583	194.9	10.71
	2018 08 20	7.36	12.1	606	27.3	6.20
	2018 10 17	7.46	6.6	574	48.5	3.22
EV_BCgw	2018 02 15	7.44	5.9	1,010	214.2	2.83
	2018 05 09	7.24	6.9	989	317.1	2.31
	2018 08 21	7.27	6.8	937	61.0	2.69
	2018 10 24	7.3	5.6	870	132.6	2.73
Elk River Distal to EVO						
EV_ER1gwS	2018 02 21	7.46	2.25	548	92.3	9.02
	2018 05 16	7.47	7.76	583	116.4	8.38
	2018 09 18	7.61	11.4	444	198.6	7.15
	2018 10 09	7.82	9.1	462.1	204	8.23
EV_ER1gwD	2018 02 21	7.64	1.1	476	73.6	9.08
	2018 05 16	8.01	6.67	462	44.4	12.77
	2018 09 18	7.39	13.12	462	-53.3	4.71
	2018 10 09	7.88	8.5	458.3	126.1	6.9

All terms defined within the body of SNC-Lavalin's report.

TABLE 4: Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Physical Parameters								Geochemical Indicators																										
		Colour	Laboratory Conductivity	Hardness	Oxidation Reduction Potential	Laboratory pH	Total Dissolved Solids	Total Suspended Solids	Laboratory Turbidity	Acidity (pH 8.3)	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Total Alkalinity	Total Anions	Total Cations	Cation Anion Balance	Bromide	Chloride	Fluoride	Sulphate	Dissolved Aluminum	Dissolved Calcium	Dissolved Iron	Dissolved Magnesium	Dissolved Manganese	Dissolved Potassium	Dissolved Sodium	Kjeldahl Nitrogen-N	Nitrogen	Ammonia, Total (as N)	Nitrate (as N)	Nitrite (as N)	Dissolved Organic Carbon	Total Organic Carbon	Ortho-Phosphate	Total Phosphorous as P
		CU	µS/c	mg/L	mV	pH	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	meq/	meq/L	%	mg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard/Guideline																																				
CSR Aquatic Life (AW)[a]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	5,000	n/a	5,000	n/a	200	n/a	n/a	n/a	n/a	1,310-18,500[e]	400	0.2-2[f]	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	5,000	n/a	5,000	n/a	200	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	5,000	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	10	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	9,500	n/a	6,500	n/a	1,500	n/a	200	n/a	n/a	n/a	10	1	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[b]		n/a	n/a	n/a	n/a	6.5-9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	23.03-100[e]	n/a	350 (max)	n/a	815-3,390[d]	n/a	n/a	n/a	n/a	1,900-24,500[e] (15°C assumed)	32.8 (max)	0.12-0.6[f]	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Long-term Average (AW)[c]		n/a	n/a	n/a	n/a	6.5-9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	309-429[d]	6.84-50[e]	n/a	n/a	n/a	767-2,600[d]	n/a	n/a	n/a	n/a	135-1,770[e] (15°C assumed)	3	0.02-0.2[f]	n/a	n/a	n/a	n/a
Grave Creek / Harmer Creek																																				
EV_GV3gw	2018 02 20	< 5.0	620	353	265	8.16	398	< 1.0	0.13	1.4	188	< 1.0	< 1.0	188	6.74	7.23	3.5	< 0.050	1.28	457	140	< 3.0	86.0	< 10	33.6	0.10	0.987	3.41	< 0.050	0.118	8.7	0.118	< 0.001	0.65	< 0.50	0.0018	0.0024
	2018 05 29	< 5.0	628	356	370	8.19	414	< 1.0	0.12	2.7	243	< 1.0	< 1.0	243	8.06	7.29	-5.0	< 0.050	1.59	526	150	3.3	86.1	< 10	34.2	0.11	1.04	3.40	< 0.050	0.134	< 5.0	0.133	0.0014	< 0.50	< 0.50	0.0021	0.0159
	2018 08 21	< 5.0	580	336	370	8.34	413	< 1.0	0.11	< 1.0	208	4.6	< 1.0	213	7.22	6.88	-2.4	< 0.050	1.57	494	139	< 3.0	80.2	< 10	32.9	< 0.10	0.998	3.25	0.104	0.237	26.0	0.133	< 0.001	< 0.50	< 0.50	< 0.0010	< 0.0020
	2018 10 18	< 5.0	615	328	393	8.03	421	< 1.0	0.23	< 1.0	224	< 1.0	< 1.0	224	7.29	6.72	-4.1	0.113	1.46	428	132	< 3.0	77.8	< 10	32.5	0.60	0.984	3.20	< 0.050	0.120	21.6	0.12	< 0.001	< 0.50	< 0.50	0.0019	0.0029
Elk River Proximal to EVO																																				
EV_BALgw	2018 03 05	< 5.0	776	366	351	7.98	500	107	70.1	13.7	359	< 1.0	< 1.0	359	9.25	8.80	-2.5	< 0.050	1.41	235	96.9	10.7	94.6	34	31.4	106	2.82	32.6	0.155	0.182	66.1	0.0218	0.0049	1.24	1.33	0.0020	0.0123
	2018 05 24	< 5.0	737	383	280	8.30	472	6.8	3.65	2.4	335	< 1.0	< 1.0	335	8.66	9.32	3.6	< 0.050	1.58	193	92.4	< 3.0	99.6	114	32.6	53.7	2.86	36.2	0.066	0.082	59.8	0.0156	< 0.001	1.04	1.03	0.0012	0.0110
	Duplicate	< 5.0	727	382	310	8.27	487	3.4	2.61	3.1	307	< 1.0	< 1.0	307	8.11	9.26	6.6	< 0.050	1.59	189	92.6	< 3.0	101	122	31.5	54.8	2.94	35.3	0.064	0.094	62.8	0.0301	< 0.001	1.05	1.12	0.0026	0.0123
	QA/QC RPD%	*	1	< 1	*	< 1	3	*	33	*	9	*	*	9	*	*	*	*	1	2	< 1	*	1	7	3	2	3	3	*	*	5	*	*	*	*	*	11
	2018 09 06	< 5.0	730	342	284	8.21	417	1.0	1.62	5.1	328	< 1.0	< 1.0	328	8.41	8.20	-1.3	< 0.050	1.60	236	86.6	< 3.0	90.1	135	28.4	41.7	2.47	29.8	0.161	0.189	69.0	0.0281	< 0.001	1.11	1.09	0.0018	0.0131
	2018 10 18	< 5.0	588	343	341	8.10	442	1.8	2.65	< 1.0	263	< 1.0	< 1.0	263	6.91	8.28	9.0	< 0.050	6.00	658	68.4	< 3.0	86.7	98	30.7	24.4	2.78	30.9	0.151	0.397	42.0	0.128	0.119	0.99	1.02	0.0014	0.0066
EV_LSgw	2018 02 15	< 5.0	973	547	250	8.01	565	9.8	17.4	12.2	508	< 1.0	< 1.0	508	12.0	11.5	-2.2	< 0.050	9.09	197	77.1	< 3.0	103	1,450	70.2	*1,080*	2.93	8.54	0.159	0.165	169	0.006	< 0.001	2.90	3.05	< 0.0010	0.0379
	2018 05 10	< 5.0	951	563	247	8.36	577	6.7	22.1	8.6	493	18.2	< 1.0	512	12.1	11.8	-1.0	0.050	8.00	251	78.1	< 3.0	107	1,870	72.2	*1,020*	3.49	8.36	0.315	0.316	157	< 0.005	0.0013	3.39	3.20	< 0.0010	0.0431
	2018 09 06	< 5.0	954	619	401	8.34	586	8.6	44.1	< 1.0	465	9.8	< 1.0	474	11.2	13.1	7.7	< 0.25	9.2	330	70.0	< 3.0	116	3,430	80.1	*1,220*	4.57	8.56	0.214	0.214	217	< 0.025	< 0.005	2.73	2.65	0.0010	0.0387
	2018 10 09	< 5.0	862	574	261	8.27	598	12.3	40.8	2.8	460	< 1.0	< 1.0	460	10.9	12.2	5.4	< 0.25	9.0	290	71.0	< 3.0	107	3,090	74.5	*1,140*	4.63	9.00	0.331	0.409	234	0.078	< 0.005	2.81	3.77	< 0.0010	0.0452
EV_GCgw	2018 02 21	< 5.0	441	209	289	7.76	266	37.4	22.4	1.8	201	< 1.0	< 1.0	201	5.59	4.38	-12.2	< 0.25	2.7	380	71.0	< 3.0	55.7	196	17.0	83.0	0.789	3.80	0.089	0.089	26.4	< 0.025	< 0.005	< 0.50	0.84	< 0.0010	0.0232
	2018 05 15	< 5.0	409	235	247	8.15	264	14.3	6.62	1.5	157	< 1.0	< 1.0	157	4.50	4.90	4.2	< 0.050	4.03	532	59.0	< 3.0	64.5	196	18.0	101	0.785	3.82	0.098	0.105	22.7	0.0055	0.0015	2.06	2.46	< 0.0010	0.0100
	2018 08 20	< 5.0	338	222	464	8.23	287	33.3	11.8	< 1.0	135	< 1.0	< 1.0	135	3.97	4.64	7.8	< 0.050	3.83	578	54.2	< 3.0	60.4	272	17.3	94.8	0.786	3.78	0.121	0.129	30.1	0.0083	< 0.001	0.81	2.33	< 0.0010	0.0176
	2018 10 23	< 5.0	438	250	241	8.23	263	4.2	3.49	< 1.0	189	< 1.0	< 1.0	189	5.24	5.19	-0.5	< 0.050	4.47	485	62.7	< 3.0	68.6	286	19.1	94.5	0.708	3.80	0.218	0.218	33.5	< 0.005	< 0.001	0.68	0.68	< 0.0010	0.0049
	Duplicate	< 5.0	440	233	363	8.24	275	4.1	3.79	1.3	193	< 1.0	< 1.0	193	5.32	4.86	-4.5	< 0.050	4.47	482	62.8	< 3.0	63.5	267	18.2	88.5	0.681	3.77	0.104	0.104	35.4	< 0.005	< 0.001	< 0.50	0.51	< 0.0010	0.0050
	QA/QC RPD%	*	< 1	7	*	< 1	4	*	8	*	2	*	*	2	*	*	*	*	0	1	< 1	*	8	7	5	7	4	1	*	*	6	*	*	*	*	*	*
EV_OCgw	2018 02 21	< 5.0	473	145	264	8.03	284	11.2	9.01	< 1.0	177	< 1.0	< 1.0	177	4.94	4.88	-0.5	< 0.050	1.69	*1,200*	62.3	< 3.0	26.9	245	19.0	74.1	1.66	44.1	0.237	0.26	61.4	0.0207	0.0021	< 0.50	< 0.50	0.0070	0.0237
	Duplicate	< 5.0	465	143	285	8.02	286	8.4	5.39	1.2	201	< 1.0	< 1.0	201	5.39	4.84	-5.4	< 0.050	1.71	*1,200*	60.4	3.0	26.0	239	19.0	76.7	1.62	44.1	0.074	0.102	61.1	0.0284	< 0.001	< 0.50	< 0.50	0.0068	0.0226
	QA/QC RPD%	*	2	1	*	< 1	1	29	50	*	13	*	*	13	*	*	*	*	1	0	3	*	3	2	0	3	2	0	*	*	0	*	*	*	*	3	5
	2018 05 15	< 5.0	467	146	296	8.41	288	1.7	1.59	< 1.0	171	10.8	< 1.0	181	5.06	4.84	-2.2	< 0.050	2.10	*1,280*	62.9	< 3.0	26.8	185	19.2	68.6	1.62	43.0	< 0.050	< 0.050	50.6	0.0114	0.0031	0.85	0.50	0.0043	0.0133
	Duplicate	< 5.0	455	149	279	8.54	298	< 1.0	0.92	< 1.0	167	16.0	< 1.0	183	5.03	4.96	-0.7	< 0.050	2.10	*1,280*	60.3	< 3.0	26.3	205	20.1	66.4	1.65	44.6	< 0.050	< 0.050	42.7	0.0336	0.0027	0.73	< 0.50	0.0053	0.0117
	QA/QC RPD%	*	3	2	*	2	3	*	53	*	2	39	*	1	*	*	*	*	0	0	4	*	2	10	5	3	2	4	*	*	17	*	*	*	*	*	13
	2018 08 20	< 5.0	486	154	285	8.57	294	4.7	2.95	< 1.0	188	11.6	< 1.0	200	5.60	5.41	-1.7	< 0.050	2.11	*1,260*	71.5	< 3.0	29.0	340	19.9	90.0	1.75	51.9	0.123	0.125	74.8	< 0.005	0.0015	0.64	0.62	0.0093	0.0191
	Duplicate	< 5.0	471	154	421	8.35	308	3.9	2.44	< 1.0	192	3.2	< 1.0	195	5.50	5.41	-0.9	< 0.050	2.20	*1,310*	70.5	3.1	28.7	337	20.0	90.4	1.73	51.9	0.142	0.142	72.0	< 0.005	< 0.001	0.54	0.53	0.0089	0.0194
	QA/QC RPD%	*	3	0	*	3	5	*	19	*	2	*	*	3	*	*	*	*	4	4	1	*	1	1	1	< 1	1	0	*	*	4	*	*	*	*	4	2
	2018 10 17	< 5.0	440	149	279	8.04	278	< 1.0	2.17	< 1.0	206	< 1.0	< 1.0	206	5.59	5.05	-5.1	0.064	2.10	*1,160*	64.5	< 3.0	28.2	330	19.1	85.5	1.59	46.0	0.149	0.150	86.3	< 0.005	0.0014	< 0.50	< 0.50	0.0083	0.0210
	Duplicate	< 5.0	482	149	368	8.31	281	1.1	2.35	< 1.0	188	4.0	< 1.0	192	5.32	5.03	-2.8	0.070	2.19	*1,150*	65.1	< 3.0	28.4	322	18.9	84.6	1.58	45.6	0.124	0.137	88.4	0.0114	0.0015	< 0.50	< 0.50	0.0084	0.0212
	QA/QC RPD%	*	9	0	*	3	1	*	8	*	9	*	*	7	*	*	*	*	4	1	1	*	1	2	1	1	1	1	*	*	2	*	*	*	*	1	1

Associated data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference
* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

[a] Standard to protect freshwater aquatic life.
[b] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute").
[c] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic").
[d] Standard/guideline varies with Hardness.
[e] Standard/guideline varies with pH.
[f] Standard/guideline varies with Chloride.
[g] Standard/guideline varies with crop.
[h] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[i] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[j] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

BOLD Concentration greater than CSR Aquatic Life (AW) standard
BOLD** Concentration greater than BCWQG Aquatic Life Short-term Maximum (AW) guideline or BCWQG Aquatic Life Long-term Average (AW) guideline (applicable to EV_OCgw)
ITALIC Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE Concentration greater than CSR Livestock Watering (LW) standard
SHADED Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																							
		Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[k] µg/L	Bismuth µg/L	Silicon µg/L
BC Standard/Guideline																									
CSR Aquatic Life (AW)[a]		90	50	10,000	1.5	12,000	0.5-4[d]	10[h]	40	20-90[e]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]	n/a	n/a
CSR Irrigation Watering (IW)		n/a	100	n/a	100	500-6,000[g]	5	5[h]	50	200	200	2,500	1	10	200	20	n/a	n/a	n/a	n/a	n/a	10	100	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	25	n/a	100	5,000	80	50[h]	1,000	300	100	5,000	2	50	1,000	30	n/a	n/a	n/a	n/a	n/a	200	100	2,000	n/a	n/a
CSR Drinking Water (DW)		6	10	1,000	8	5,000	5	50[h]	20[i]	1,500	10	8	1	250	80	10	20	2,500	n/a	2,500	n/a	20	20	3,000	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[b]		n/a	5	n/a	n/a	n/a	0.038-2.8[d]	n/a	110	3.2-39.6[d]	3-417[d]	n/a	0.02[j]	2,000	n/a	n/a	0.1-3[d]	n/a	n/a	n/a	n/a	n/a	n/a	33-340[d]	n/a	n/a
BCWQG Aquatic Life Long-term Average (AW)[c]		9	n/a	1,000	0.13	1,200	0.018-0.457[d]	1 (Cr(+6))	4	2-10[d]	3-19.6[d]	n/a	n/a	1,000	25-150[d]	2	0.05-1.5[d]	n/a	0.8	n/a	n/a	8.5	n/a	7.5-187.5[d]	n/a	n/a
Grave Creek / Harmer Creek																									
EV_GV3gw	2018 02 20	< 0.10	< 0.10	17.5	< 0.020	12	0.0084	0.23	< 0.10	< 0.50	< 0.050	16.0	< 0.0050	0.886	< 0.50	3.92	< 0.010	587	< 0.010	< 0.10	< 10	1.64	< 0.50	< 3.0	< 0.050	3,240
	2018 05 29	< 0.10	< 0.10	18.8	< 0.020	12	0.0081	0.17	< 0.10	< 0.50	< 0.050	14.8	< 0.0050	0.991	< 0.50	4.09	< 0.010	573	< 0.010	< 0.10	< 10	1.85	< 0.50	< 1.0	< 0.050	3,190
	2018 08 21	< 0.10	< 0.10	17.3	< 0.020	11	0.0088	0.21	< 0.10	< 0.50	< 0.050	15.2	< 0.0050	0.927	< 0.50	4.36	< 0.010	527	< 0.010	< 0.10	< 10	1.71	< 0.50	< 1.0	< 0.050	3,270
	2018 10 18	< 0.10	< 0.10	17.8	< 0.020	12	0.0081	0.24	< 0.10	< 0.50	< 0.050	15.1	< 0.0050	0.986	< 0.50	4.34	< 0.010	555	< 0.010	< 0.10	< 10	1.62	< 0.50	< 1.0	< 0.050	3,380
Elk River Proximal to EVO																									
EV_BALgw	2018 03 05	0.26	0.33	35.4	< 0.020	201	0.0193	< 0.10	0.29	< 0.50	< 0.050	112	< 0.0050	1.79	0.80	0.521	< 0.010	2,390	< 0.010	< 0.10	< 10	0.214	< 0.50	< 3.0	< 0.050	4,460
	2018 05 24	0.15	0.38	36.3	< 0.020	160	< 0.0050	< 0.10	0.15	< 0.50	< 0.050	127	< 0.0050	1.16	0.58	0.555	< 0.010	2,250	< 0.010	< 0.10	< 10	0.205	< 0.50	2.7	< 0.050	4,480
	Duplicate	0.15	0.34	36.2	< 0.020	155	< 0.0050	< 0.10	0.16	< 0.50	< 0.050	125	< 0.0050	1.20	0.73	0.537	< 0.010	2,370	< 0.010	< 0.10	< 10	0.213	< 0.50	1.8	< 0.050	4,380
	QA/QC RPD%	*	*	< 1	*	3	*	*	*	*	*	2	*	3	*	3	*	5	*	*	*	4	*	*	*	2
	2018 09 06	< 0.10	0.27	35.6	< 0.020	159	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	107	< 0.0050	0.717	< 0.50	0.491	< 0.010	2,170	< 0.010	< 0.10	< 10	0.172	< 0.50	6.1	< 0.050	4,540
	2018 10 18	< 0.10	0.22	32.9	< 0.020	165	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	113	< 0.0050	0.522	0.74	0.326	< 0.010	2,300	< 0.010	< 0.10	< 10	0.150	< 0.50	2.4	< 0.050	4,610
EV_LSgw	2018 02 15	< 0.10	1.25	154	< 0.020	31	< 0.0050	< 0.10	0.92	< 0.50	< 0.050	52.4	< 0.0050	2.59	3.79	0.116	< 0.010	413	0.038	< 0.10	< 10	2.11	< 0.50	< 3.0	< 0.050	3,570
	2018 05 10	< 0.10	1.47	151	< 0.020	38	0.0062	< 0.10	0.88	< 0.50	< 0.050	64.9	< 0.0050	2.81	3.96	0.075	< 0.010	463	0.032	< 0.10	< 10	2.26	< 0.50	1.9	< 0.050	3,900
	2018 09 06	< 0.10	2.63	268	< 0.020	56	< 0.0050	< 0.10	1.31	< 0.50	< 0.050	62.0	< 0.0050	2.90	4.61	0.073	< 0.010	503	0.046	< 0.10	< 10	1.53	< 0.50	2.0	< 0.050	5,110
	2018 10 09	< 0.10	2.79	202	< 0.020	48	< 0.0050	< 0.10	1.20	< 0.50	< 0.050	58.2	< 0.0050	2.51	4.68	0.077	< 0.010	463	0.047	< 0.10	< 10	1.64	< 0.50	1.3	< 0.050	5,110
EV_GCgw	2018 02 21	< 0.10	1.57	78.9	< 0.020	13	< 0.0050	< 0.10	0.18	< 0.50	< 0.050	6.7	< 0.0050	2.08	0.62	< 0.050	< 0.010	264	0.032	< 0.10	< 10	1.11	< 0.50	< 3.0	< 0.10	4,320
	2018 05 15	< 0.10	2.01	77.2	< 0.020	13	< 0.0050	< 0.10	0.27	< 0.50	< 0.050	7.5	< 0.0050	2.54	0.76	< 0.050	< 0.010	262	0.028	< 0.10	< 10	1.19	< 0.50	1.6	< 0.050	4,220
	2018 08 20	< 0.10	2.32	74.8	< 0.020	14	< 0.0050	< 0.10	0.22	< 0.50	< 0.050	7.8	< 0.0050	2.51	0.64	< 0.050	< 0.010	256	0.017	< 0.10	< 10	1.10	< 0.50	1.3	< 0.050	4,270
	2018 10 23	< 0.10	1.94	76.5	< 0.020	13	< 0.0050	< 0.10	0.22	< 0.50	< 0.050	7.9	< 0.0050	2.46	0.66	< 0.050	< 0.010	275	0.023	< 0.10	< 10	1.14	< 0.50	1.6	< 0.050	4,250
	Duplicate	< 0.10	1.88	68.8	< 0.020	12	< 0.0050	< 0.10	0.20	< 0.50	< 0.050	7.6	< 0.0050	2.43	0.54	< 0.050	< 0.010	263	0.021	< 0.10	< 10	1.06	< 0.50	1.4	< 0.050	3,990
	QA/QC RPD%	*	3	11	*	*	*	*	*	*	*	4	*	1	*	*	*	4	*	*	*	7	*	*	*	6
EV_OCgw	2018 02 21	< 0.10	1.22	59.0	< 0.020	120	< 0.0050	< 0.10	< 0.10	0.72	< 0.050	22.8	< 0.00050	*12.4*	< 0.50	< 0.050	< 0.010	406	< 0.010	< 0.10	< 10	1.06	< 0.50	< 3.0	< 0.050	5,250
	Duplicate	< 0.10	1.32	58.7	< 0.020	122	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	23.1	< 0.00050	*13.7*	< 0.50	0.087	< 0.010	412	< 0.010	< 0.10	< 10	1.12	< 0.50	< 3.0	< 0.050	4,440
	QA/QC RPD%	*	8	1	*	2	*	*	*	*	*	1	*	10	*	*	*	1	*	*	*	6	*	*	*	17
	2018 05 15	< 0.10	1.48	55.9	< 0.020	102	0.0073	< 0.10	0.20	2.18	< 0.050	23.1	< 0.00050	*15.5*	< 0.50	< 0.050	< 0.010	442	< 0.010	< 0.10	< 10	1.34	< 0.50	7.4	< 0.050	4,430
	Duplicate	< 0.10	1.41	58.6	< 0.020	102	< 0.0050	< 0.10	0.19	< 0.50	< 0.050	23.1	< 0.00050	*15.3*	< 0.50	< 0.050	< 0.010	451	< 0.010	< 0.10	< 10	1.36	< 0.50	< 1.0	< 0.050	4,460
	QA/QC RPD%	*	5	5	*	0	*	*	*	*	*	0	*	1	*	*	*	2	*	*	*	1	*	*	*	1
	2018 08 20	< 0.10	1.45	60.5	< 0.020	121	< 0.0050	< 0.10	0.13	< 0.50	< 0.050	26.4	< 0.00050	*14.9*	< 0.50	< 0.050	< 0.010	412	< 0.010	< 0.10	< 10	1.13	< 0.50	2.0	< 0.050	4,520
	Duplicate	< 0.10	1.53	60.1	< 0.020	122	< 0.0050	< 0.10	0.13	< 0.50	< 0.050	26.0	< 0.00050	*14.8*	< 0.50	< 0.050	< 0.010	405	< 0.010	< 0.10	< 10	1.10	< 0.50	< 1.0	< 0.050	4,560
	QA/QC RPD%	*	5	1	*	1	*	*	*	*	*	2	*	1	*	*	*	2	*	*	*	3	*	*	*	1
	2018 10 17	< 0.10	1.49	54.3	< 0.020	133	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	26.7	< 0.00050	*14.5*	< 0.50	< 0.050	< 0.010	392	< 0.010	< 0.10	< 10	1.09	< 0.50	< 1.0	< 0.050	4,580
	Duplicate	< 0.10	1.47	54.1	< 0.020	131	< 0.0050	< 0.10	0.10	< 0.50	< 0.050	26.6	< 0.00050	*14.4*	< 0.50	< 0.050	< 0.010	387	< 0.010	< 0.10	< 10	1.09	< 0.50	< 1.0	< 0.050	4,610
	QA/QC RPD%	*	1	< 1	*	2	*	*	*	*	*	< 1	*	1	*	*	*	1	*	*	*	0	*	*	*	1

Associated data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference
* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

[a] Standard to protect freshwater aquatic life.
[b] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute").
[c] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic").
[d] Standard/guideline varies with Hardness.
[e] Standard/guideline varies with pH.
[f] Standard/guideline varies with Chloride.
[g] Standard/guideline varies with crop.
[h] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[i] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[j] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BOLD**	Concentration greater than BCWQG Aquatic Life Short-term Maximum (AW) guideline or BCWQG Aquatic Life Long-term Average (AW) guideline (applicable to EV_OCgw)
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Physical Parameters: Colour CU	Laboratory Conductivity µS/c	Hardness mg/L	Oxidation Reduction Potential mV	Laboratory pH	Total Dissolved Solids mg/L	Total Suspended Solids mg/L	Laboratory Turbidity NTU	Geochemical Indicators: Acidity (pH 8.3) mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Total Alkalinity mg/L	Total Anions meq/	Total Cations meq/L	Cation Anion Balance %	Bromide mg/L	Chloride mg/L	Fluoride µg/L	Sulphate mg/L	Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Kjeldahl Nitrogen-N mg/L	Nitrogen mg/L	Ammonia, Total (as N) µg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Dissolved Organic Carbon mg/L	Total Organic Carbon mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P mg/L
BC Standard/Guideline																																						
CSR Aquatic Life (AW)[a]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	5,000	n/a	5,000	n/a	200	n/a	n/a	n/a	n/a	n/a	1,310-18,500[e]	400	0.2-2[f]	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	5,000	n/a	5,000	n/a	200	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	5,000	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	10	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	9,500	n/a	6,500	n/a	1,500	n/a	200	n/a	n/a	n/a	10	1	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[b]		n/a	n/a	n/a	n/a	6.5-9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	23.03-100[e]	n/a	350 (max)	n/a	815-3,390[d]	n/a	n/a	n/a	n/a	1,900-24,500[e] (15°C assumed)	32.8 (max)	0.12-0.6[f]	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Long-term Average (AW)[c]		n/a	n/a	n/a	n/a	6.5-9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	309-429[d]	6.84-50[e]	n/a	n/a	n/a	767-2,600[d]	n/a	n/a	n/a	n/a	135-1,770[e] (15°C assumed)	3	0.02-0.2[f]	n/a	n/a	n/a	n/a
Erickson Creek																																						
EV_WF_SW	2018 03 14	< 5.0	502	241	265	8.12	620	43.2	47.1	2.0	73.1	< 1.0	< 1.0	73.1	5.29	5.10	-1.8	< 0.050	2.89	89	180	3.1	22.6	639	44.7	*342*	2.46	3.96	0.45	0.46	135	0.0083	< 0.001	4.78	6.65	< 0.0010	0.0241
	2018 05 24	< 5.0	352	159	311	7.67	220	83.8	65.0	3.5	36.0	< 1.0	< 1.0	36.0	3.42	3.65	3.3	< 0.050	2.16	< 20	126	< 6.0	14.8	13	29.7	104	8.42	5.43	0.323	0.350	182	0.025	0.0023	2.30	2.91	< 0.0010	0.0132
	2018 09 18	< 5.0	455	203	350	7.96	293	23.4	16.4	1.9	61.9	< 1.0	< 1.0	61.9	4.80	4.34	-5.0	< 0.050	3.11	93	166	< 3.0	17.6	< 10	38.6	*230*	2.76	4.53	0.513	0.529	185	0.0144	0.0013	2.28	3.91	< 0.0010	0.0100
	2018 10 24	< 5.0	506	211	274	7.81	355	25.4	24.2	1.1	89.2	< 1.0	< 1.0	89.2	5.96	4.50	-14.0	0.111	3.08	71	196	< 3.0	17.7	28	40.4	*277*	2.60	4.58	0.223	0.229	141	0.0069	< 0.001	1.94	1.70	< 0.0010	0.0127
EV_ECgw	2018 02 20	< 5.0	411	177	244	8.19	324	1,050	823	< 1.0	191	< 1.0	< 1.0	191	4.41	4.82	4.4	< 0.050	0.90	764	25.1	3.2	38.4	< 10	19.7	195	0.937	28.4	1.01	1.12	184	0.112	0.0066	2.84	19	0.0129	1.15
	2018 05 10	< 5.0	394	157	265	8.36	261	233	179	< 1.0	188	5.8	< 1.0	194	4.47	4.21	-3.0	< 0.050	0.57	840	24.9	< 3.0	36.0	< 10	16.4	146	0.935	23.9	0.314	0.471	111	0.147	0.0101	0.85	< 2.5	0.0130	0.189
	2018 09 19	< 5.0	418	178	332	8.06	306	20.3	21.8	< 1.0	203	< 1.0	< 1.0	203	4.70	4.76	0.6	< 0.050	0.99	850	26.7	< 3.0	38.6	< 10	19.7	178	3.74	25.4	0.588	0.729	109	0.131	0.01	2.63	2.29	0.0076	0.0260
	2018 10 24	< 5.0	404	178	267	8.40	245	100	68.3	1.4	222	8.4	< 1.0	230	5.20	4.87	-3.2	< 0.050	0.56	910	25.0	< 3.0	38.5	< 10	19.9	187	1.15	29.4	0.279	0.415	126	0.127	0.0091	1.95	4.9	0.0218	0.108
Michel Creek																																						
EV_MCgwS	2018 03 08	< 5.0	792	366	315	8.12	513	5.8	22.3	4.2	250	< 1.0	< 1.0	250	8.43	8.61	1.1	0.206	40.8	259	109	< 3.0	91.7	1,900	33.3	114	1.69	26.1	0.121	0.121	126	< 0.005	< 0.001	1.59	1.17	< 0.0010	0.0039
	2018 05 10	< 5.0	819	391	328	7.98	516	6.7	29.5	6.0	266	< 1.0	< 1.0	266	9.21	9.45	1.3	0.158	38.4	385	134	< 3.0	100	2,090	34.0	124	1.68	33.9	0.316	0.318	143	< 0.005	0.0016	1.30	1.24	< 0.0010	0.0039
	2018 08 20	< 5.0	820	388	461	8.28	532	4.3	13.5	< 1.0	256	< 1.0	< 1.0	256	9.04	9.62	3.1	0.171	39.2	446	135	< 3.0	97.8	1,600	34.8	133	1.87	39.6	0.249	0.310	171	0.0613	< 0.001	1.42	1.52	< 0.0010	0.0054
	2018 10 17	< 5.0	801	367	419	7.91	527	9.0	18.5	< 1.0	271	< 1.0	< 1.0	271	10.0	9.33	-3.5	0.257	42.6	446	161	< 3.0	92.1	1,560	33.4	133	1.96	42.3	0.305	0.415	180	0.104	0.0069	2.15	2.47	< 0.0010	0.0136
EV_MCgwD	2018 03 08	< 5.0	533	239	240	8.41	321	34.0	25.8	< 1.0	221	12.0	< 1.0	233	5.87	5.80	-0.7	0.077	6.49	873	47.1	< 3.0	52.6	< 10	26.0	*388*	1.66	22.3	0.219	0.326	14.2	0.102	0.0045	1.91	2.38	< 0.0010	0.0433
	2018 05 10	< 5.0	595	243	233	8.40	377	599	410	< 1.0	245	13.6	< 1.0	259	7.09	6.72	-2.7	< 0.050	3.24	*1,130*	85.1	< 3.0	53.7	< 10	26.3	*303*	1.51	41.7	0.634	0.707	126	0.0671	0.0054	1.32	< 2.5	0.0092	0.583
	2018 08 20	< 5.0	570	230	416	8.43	376	184	155	< 1.0	241	3.8	< 1.0	244	6.53	7.07	4.0	< 0.050	4.57	*1,060*	69.6	< 3.0	50.9	< 10	25.0	*317*	1.58	55.6	0.524	0.659	112	0.131	0.0036	1.65	< 5.0	0.0051	0.351
	2018 10 17	< 5.0	540	240	303	8.07	349	156	103	< 1.0	259	< 1.0	< 1.0	259	6.78	6.30	-3.7	0.082	3.67	998	69.3	< 3.0	52.3	< 10	26.5	164	1.42	33.6	0.394	0.478	76.2	0.0794	0.0043	2.17	1.82	0.0051	0.225
EV_BCgw	2018 02 15	5.2	1,040	582	327	7.81	788	1.8	1.10	8.0	271	< 1.0	< 1.0	271	12.8	11.9	-3.5	< 0.050	9.46	102	311	< 3.0	142	11	55.0	< 0.10	1.33	5.51	< 0.050	8.27	< 5.0	8.25	0.0131	0.74	0.77	0.0035	0.0035
	Duplicate	< 5.0	1,040	572	333	7.81	771	1.4	0.67	5.9	270	< 1.0	< 1.0	270	12.7	11.7	-4.3	< 0.050	9.38	106	311	< 3.0	139	< 10	54.7	< 0.10	1.32	5.40	0.088	8.32	5.4	8.23	0.0059	< 0.50	< 0.50	0.0035	0.0035
	QA/QC RPD%	*	0	2	*	0	2	*	49	30	0	*	*	< 1	*	*	*	*	1	4	0	*	2	*	1	*	1	2	*	< 1	*	< 1	76	*	*	*	*
	2018 05 09	< 5.0	990	546	347	8.24	740	7.7	2.18	< 1.0	204	< 1.0	< 1.0	204	10.9	11.2	1.4	< 0.050	9.14	154	289	< 3.0	131	< 10	53.0	< 0.10	1.32	5.60	0.439	7.90	< 5.0	7.46	< 0.001	1.07	1.06	0.0041	0.0108
	2018 08 21	< 5.0	781	491	394	8.17	675	4.9	1.01	1.1	145	< 1.0	< 1.0	145	9.54	10.1	2.7	< 0.25	7.99	160	287	< 3.0	113	< 10	50.6	< 0.10	1.31	5.01	0.336	6.51	10.0	6.17	< 0.005	0.75	0.70	0.0010	0.0070
	2018 10 24	< 5.0	832	493	330	7.89	608	3.4	2.64	5.8	217	< 1.0	< 1.0	217	10.2	10.1	-0.2	0.146	7.04	136	253	< 3.0	116	< 10	49.1	0.25	1.32	5.39	0.275	5.26	13.1	4.98	< 0.001	1.40	1.34	0.0021	0.0071
Elk River Distal to EVO																																						
EV_ER1gwS	2018 02 21	< 5.0	577	277	469	7.82	355	< 1.0	0.17	2.7	252	< 1.0	< 1.0	252	7.19	5.91	-9.8	< 0.050	10.4	122	82.2	< 3.0	71.4	< 10	23.9	0.77	0.803	8.31	0.54	2.61	7.7	2.08	< 0.001	< 0.50	< 0.50	0.0026	0.0039
	2018 05 16	< 5.0	512	268	329	7.95	379	< 1.0	0.12	3.2	209	< 1.0	< 1.0	209	6.43	5.84	-4.7	< 0.050	17.5	170	77.7	< 3.0	74.5	< 10	19.9	< 0.10	0.945	10.8	< 0.20	1.89	< 5.0	1.89	< 0.001	< 0.50	< 0.50	< 0.0010	0.0022
	2018 09 18	< 5.0	459	244	458	8.07	308	< 1.0	0.21	3.6	167	< 1.0	< 1.0	167	5.12	5.03	-0.9	< 0.050	2.84	221	74.5	< 3.0	65.8	< 10	19.4	0.26	0.848	3.07	0.389	2.36	< 5.0	1.97	< 0.001	0.77	0.72	0.0018	< 0.0020
	2018 10 09	< 5.0	453	233	286	8.38	290	< 1.0	0.18	< 2.0	169	5.6	< 1.0	175	5.21	4.81	-4.0	< 0.050	3.31	207	71.2	< 3.0	60.8	< 10	19.6	< 0.10	0.829	3.23	0.057	1.91	< 5.0	1.85	< 0.001	< 0.50	< 0.50	0.0033	0.0030
EV_ER1gwD	2018 02 21	< 5.0	507	247	306	7.89	326	45.8	22.8	2.7	182	< 1.0	< 1.0	182	5.45	5.10	-3.4	< 0.050	3.83	164	75.3	9.2	60.9	< 10	23.0	0.47	0.640	3.34	0.40	2.33	7.5	1.93	< 0.001	< 0.50	< 0.50	0.0030	0.0791
	2018 05 16	< 5.0	418	228	322	8.16	293	567	195	1.8	225	< 1.0	< 1.0	225	5.87	4.71	-10.9	< 0.050	4.67	201	54.4	8.0	59.5	< 10	19.2	2.53	0.610	3.25	0.75	2.18	6.0	1.44	< 0.001	0.59	3.12	0.0015	0.917
	2018 09 18	< 5.0	449	233	347	8.20	279	8.2	7.43	1.7	214	< 1.0	< 1.0	214	5.23	4.82	-4.2	< 0.050	5.73	261	34.8	7.5	59.8	< 10	20.4	77.1	0.803	2.95	0.352	1.06	9.8	0.704	< 0.001	1.75	1.82	< 0.0010	0.0088
	2018 10 09	< 5.0	408	229	310	8.16	268	21.6	9.61	< 2.0	175	< 1.0	< 1.0	175	4.56	4.72	1.7	< 0.050	5.14	243	40.7	11.5	58.8	12	20.0	2.65	0.773	2.74	0.081	1.02	27.2	0.937	< 0.001	< 0.50	0.66	0.0018	0.0260

Associated data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference
* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

[a] Standard to protect freshwater aquatic life.
[b] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute").
[c] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic").
[d] Standard/guideline varies with Hardness.
[e] Standard/guideline varies with pH.
[f] Standard/guideline varies with Chloride.
[g] Standard/guideline varies with crop.
[h] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[i] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[j] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

BOLD Concentration greater than CSR Aquatic Life (AW) standard
BOLD** Concentration greater than BCWQG Aquatic Life Short-term Maximum (AW) guideline or BCWQG Aquatic Life Long-term Average (AW) guideline (applicable to EV_OCgw)
ITALIC Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE Concentration greater than CSR Livestock Watering (LW) standard
SHADED Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																							
		Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[k] µg/L	Bismuth µg/L	Silicon µg/L
BC Standard/Guideline																									
CSR Aquatic Life (AW)[a]		90	50	10,000	1.5	12,000	0.5-4[d]	10[g]	40	20-90[e]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]	n/a	n/a
CSR Irrigation Watering (IW)		n/a	100	n/a	100	500-6,000[g]	5	5[g]	50	200	200	2,500	1	10	200	20	n/a	n/a	n/a	n/a	n/a	10	100	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	25	n/a	100	5,000	80	50[g]	1,000	300	100	5,000	2	50	1,000	30	n/a	n/a	n/a	n/a	n/a	200	100	2,000	n/a	n/a
CSR Drinking Water (DW)		6	10	1,000	8	5,000	5	50[g]	20[h]	1,500	10	8	1	250	80	10	20	2,500	n/a	2,500	n/a	20	20	3,000	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[b]		n/a	5	n/a	n/a	n/a	0.038-2.8[d]	n/a	110	3.2-39.6[d]	3-417[d]	n/a	0.02[j]	2,000	n/a	n/a	0.1-3[d]	n/a	n/a	n/a	n/a	n/a	n/a	33-340[d]	n/a	n/a
BCWQG Aquatic Life Long-term Average (AW)[c]		9	n/a	1,000	0.13	1,200	0.018-0.457[d]	1 (Cr(+6))	4	2-10[d]	3-19.6[d]	n/a	n/a	1,000	25-150[d]	2	0.05-1.5[d]	n/a	0.8	n/a	n/a	8.5	n/a	7.5-187.5[d]	n/a	n/a
Erickson Creek																									
EV_WF_SW	2018 03 14	< 0.10	0.11	6.51	< 0.020	< 10	0.0428	< 0.10	0.10	< 0.50	< 0.050	11.3	< 0.0050	1.18	0.52	0.051	< 0.010	17.5	< 0.010	< 0.10	< 10	0.102	< 0.50	< 3.0	< 0.10	153
	2018 05 24	0.26	0.14	15.2	< 0.020	< 10	0.0221	< 0.10	< 0.10	9.79	0.085	8.4	< 0.0050	0.677	3.98	0.289	< 0.010	21.7	0.011	4.84	< 10	0.050	< 0.50	8.7	< 0.050	143
	2018 09 18	< 0.10	< 0.10	7.47	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	9.8	0.0067	0.471	< 0.50	0.062	< 0.010	14.5	< 0.010	0.11	< 10	0.020	< 0.50	< 1.0	< 0.050	< 50
	2018 10 24	< 0.10	0.11	7.70	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	10.6	< 0.0050	0.443	< 0.50	< 0.050	< 0.010	13.9	< 0.010	0.12	< 10	< 0.010	< 0.50	< 1.0	< 0.050	< 50
EV_ECgw	2018 02 20	< 0.10	0.40	52.8	< 0.020	102	0.0147	0.14	0.30	0.87	< 0.050	10.9	< 0.0050	*13.7*	1.77	0.15	< 0.010	443	0.015	0.20	< 10	1.23	< 0.50	< 3.0	< 0.050	4,580
	2018 05 10	< 0.10	0.32	49.4	< 0.020	103	0.0365	< 0.10	0.24	4.72	< 0.050	11.7	< 0.0050	*14.1*	1.30	0.089	< 0.010	425	0.021	0.37	< 10	1.25	< 0.50	9.0	< 0.050	4,350
	2018 09 19	< 0.10	0.45	61.1	< 0.020	117	0.0481	< 0.10	0.32	5.85	< 0.050	11.3	< 0.0050	*15.3*	6.63	0.206	< 0.010	471	0.026	0.31	< 10	1.08	< 0.50	6.1	< 0.050	4,930
	2018 10 24	< 0.10	0.41	59.4	< 0.020	124	0.0326	< 0.10	0.31	1.22	< 0.050	11.8	< 0.0050	*14.2*	2.02	0.069	< 0.010	409	0.028	< 0.10	< 10	1.22	< 0.50	2.8	< 0.050	4,970
Michel Creek																									
EV_MCgwS	2018 03 08	< 0.10	1.24	24.0	< 0.020	23	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	23.8	< 0.00050	3.13	0.57	< 0.050	< 0.010	291	< 0.010	< 0.10	< 10	1.88	< 0.50	< 3.0	< 0.050	4,930
	2018 05 10	< 0.10	1.50	25.8	< 0.020	25	< 0.0050	< 0.10	0.12	0.71	< 0.050	25.4	< 0.00050	3.45	0.91	< 0.050	< 0.010	290	< 0.010	< 0.10	< 10	2.18	< 0.50	5.7	< 0.050	4,830
	2018 08 20	< 0.10	0.97	26.6	< 0.020	26	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	25.6	< 0.00050	2.19	< 0.50	1.31	< 0.010	312	< 0.010	< 0.10	< 10	1.65	< 0.50	< 1.0	< 0.050	5,210
	2018 10 17	< 0.10	1.22	25.1	< 0.020	31	< 0.0050	0.35	0.12	< 0.50	< 0.050	25.2	< 0.00050	3.95	0.82	< 0.050	< 0.010	313	< 0.010	< 0.10	< 10	2.03	< 0.50	< 1.0	< 0.050	5,490
EV_MCgwD	2018 03 08	0.25	0.68	82.9	< 0.020	63	0.0503	< 0.10	0.84	3.64	< 0.050	8.7	< 0.00050	*11.8*	15.9	0.189	< 0.010	506	0.074	0.10	< 10	2.44	< 0.50	28.4	< 0.050	4,910
	2018 05 10	0.16	0.55	70.2	< 0.020	68	0.0434	< 0.10	0.41	1.83	< 0.050	10.3	< 0.00050	*16.5*	6.75	0.263	< 0.010	486	0.075	< 0.10	< 10	3.73	< 0.50	5.3	< 0.050	4,890
	2018 08 20	0.14	0.64	62.6	< 0.020	66	0.0552	< 0.10	0.50	2.63	< 0.050	11.5	< 0.00050	*18.0*	5.49	0.216	< 0.010	471	0.068	< 0.10	< 10	3.99	< 0.50	10.7	< 0.050	5,220
	2018 10 17	0.14	0.47	66.8	< 0.020	76	0.0627	0.14	0.19	2.08	< 0.050	9.7	< 0.00050	*15.5*	5.02	0.231	< 0.010	483	0.062	< 0.10	< 10	3.03	< 0.50	8.8	< 0.050	5,050
EV_BCgw	2018 02 15	0.11	0.12	46.5	< 0.020	17	0.0521	0.14	< 0.10	< 0.50	< 0.050	36.6	< 0.0050	0.727	< 0.50	***46.9***	< 0.010	243	0.017	< 0.10	< 10	1.72	< 0.50	< 3.0	< 0.050	2,880
	Duplicate	0.11	0.12	44.6	< 0.020	17	0.0446	0.15	< 0.10	< 0.50	< 0.050	35.7	< 0.0050	0.708	< 0.50	***45.7***	< 0.010	240	0.015	< 0.10	< 10	1.69	< 0.50	< 3.0	< 0.050	2,930
	QA/QC RPD%	*	*	4	*	*	16	*	*	*	*	2	*	3	*	3	*	1	*	*	*	2	*	*	*	2
	2018 05 09	0.13	0.15	44.9	< 0.020	15	0.0504	0.18	< 0.10	0.91	< 0.050	31.7	< 0.0050	0.943	0.74	***39***	< 0.010	232	0.015	< 0.10	< 10	1.69	< 0.50	2.1	< 0.050	3,010
	2018 08 21	0.11	0.11	42.1	< 0.020	14	0.0480	0.13	< 0.10	< 0.50	< 0.050	28.7	< 0.0050	0.810	0.63	***36.7***	< 0.010	209	0.015	< 0.10	< 10	1.60	< 0.50	2.1	< 0.050	2,800
	2018 10 24	< 0.10	0.11	39.9	< 0.020	18	0.0448	0.16	< 0.10	0.56	< 0.050	29.9	< 0.0050	0.839	1.10	***29.8***	< 0.010	194	0.014	< 0.10	< 10	1.53	< 0.50	2.7	< 0.050	2,810
Elk River Distal to EVO																									
EV_ER1gwS	2018 02 21	< 0.10	0.12	133	< 0.020	11	0.0163	0.34	< 0.10	4.90	< 0.050	7.3	< 0.0050	0.966	< 0.50	10.8	< 0.010	235	< 0.010	< 0.10	< 10	1.10	< 0.50	7.8	< 0.050	2,490
	2018 05 16	< 0.10	0.11	128	< 0.020	13	0.0184	0.25	< 0.10	< 0.50	< 0.050	7.6	< 0.0050	0.800	< 0.50	8.02	< 0.010	209	< 0.010	< 0.10	< 10	0.999	< 0.50	< 1.0	< 0.050	2,750
	2018 09 18	< 0.10	0.15	108	< 0.020	< 10	0.0132	0.24	< 0.10	< 0.50	< 0.050	7.8	< 0.0050	1.33	< 0.50	11.8	< 0.010	195	< 0.010	< 0.10	< 10	1.16	< 0.50	< 2.0	< 0.050	2,240
	2018 10 09	< 0.10	0.13	101	< 0.020	< 10	0.0103	0.28	< 0.10	< 0.50	< 0.050	7.6	< 0.0050	1.32	< 0.50	10.5	< 0.010	187	< 0.010	< 0.10	< 10	1.18	< 0.50	< 1.0	< 0.050	2,360
EV_ER1gwD	2018 02 21	< 0.10	0.12	90.2	< 0.020	< 10	< 0.0050	0.35	< 0.10	< 0.50	< 0.050	6.2	< 0.0050	1.15	< 0.50	10.1	< 0.010	215	< 0.010	< 0.10	< 10	1.43	< 0.50	< 3.0	< 0.050	2,450
	2018 05 16	< 0.10	0.11	78.6	< 0.020	12	< 0.0050	0.72	< 0.10	< 0.50	< 0.050	7.2	< 0.0050	1.45	0.56	7.52	< 0.010	193	< 0.010	< 0.10	< 10	1.48	< 0.50	< 1.0	< 0.050	2,750
	2018 09 18	< 0.10	0.19	99.5	< 0.020	< 10	< 0.0050	0.34	0.29	< 0.60	< 0.050	7.3	< 0.0050	1.61	1.61	4.56	< 0.010	193	< 0.010	< 0.10	< 10	1.45	< 0.50	< 3.0	< 0.050	3,230
	2018 10 09	< 0.10	0.10	84.8	< 0.020	< 10	0.0051	0.46	< 0.10	< 0.50	< 0.050	7.7	< 0.0050	1.48	0.55	5.99	< 0.010	197	< 0.010	< 0.10	< 10	1.42	< 0.50	< 1.0	< 0.050	3,140

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< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
QA/QC RPD Denotes quality assurance/quality control relative percent difference
* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

[a] Standard to protect freshwater aquatic life.
[b] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute").
[c] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic").
[d] Standard/guideline varies with Hardness.
[e] Standard/guideline varies with pH.
[f] Standard/guideline varies with Chloride.
[g] Standard/guideline varies with crop.
[h] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[i] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[j] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BOLD**	Concentration greater than BCWQG Aquatic Life Short-term Maximum (AW) guideline or BCWQG Aquatic Life Long-term Average (AW) guideline (applicable to EV_OCgw)
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Physical Parameters: Colour CU	Laboratory Conductivity µS/c	Hardness mg/L	Oxidation Reduction Potential mV	Laboratory pH pH	Total Dissolved Solids mg/L	Total Suspended Solids mg/L	Laboratory Turbidity NTU	Geochemical Indicators: Acidity (pH 8.3) mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Total Alkalinity mg/L	Total Anions meq/	Total Cations meq/L	Cation Anion Balance %	Bromide mg/L	Chloride mg/L	Fluoride µg/L	Sulfate mg/L	Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Kjeldahl Nitrogen-N mg/L	Nitrogen mg/L	Ammonia, Total (as N) µg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Dissolved Organic Carbon mg/L	Total Organic Carbon mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P mg/L
BC Standard/Guideline																																						
CSR Aquatic Life (AW)[a]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	5,000	n/a	5,000	n/a	200	n/a	n/a	n/a	n/a	1,310-18,500[e]	400	0.2-2[f]	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1,000	n/a	5,000	n/a	5,000	n/a	200	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1,000	1,000	5,000	1,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	10	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1,500	500	9,500	n/a	6,500	n/a	1,500	n/a	200	n/a	n/a	n/a	10	1	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[b]		n/a	n/a	n/a	n/a	6.5-9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	23.03-100[e]	n/a	350 (max)	n/a	815-3,390[d]	n/a	n/a	n/a	n/a	1,900-24,500[e] (15°C assumed)	32.8 (max)	0.12-0.6[f]	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Long-term Average (AW)[c]		n/a	n/a	n/a	n/a	6.5-9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	309-429[d]	6.84-50[e]	n/a	n/a	n/a	767-2,600[d]	n/a	n/a	n/a	n/a	135-1,770[e] (15°C assumed)	3	0.02-0.2[f]	n/a	n/a	n/a	n/a
Field Blanks																																						
EV_BCgw	2018 02 15	< 5.0	< 2.0	< 0.50	524	5.45	< 10	< 1.0	0.18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0	< 0	0	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 5.0	< 0.005	< 0.001	< 0.50	< 0.50	< 0.0010	< 0.0010
EV_BALgw	2018 05 24	< 5.0	< 2.0	< 0.50	367	5.69	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0	< 0	0	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	6.2	< 0.005	< 0.001	< 0.50	< 0.50	< 0.0010	< 0.0010
EV_GCgw	2018 10 23	< 5.0	< 2.0	< 0.50	304	5.64	< 10	< 1.0	< 0.10	2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0	< 0	0	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	8.7	< 0.005	< 0.001	< 0.50	< 0.50	< 0.0010	< 0.0020
EV_OCgw	2018 02 21	< 5.0	< 2.0	< 0.50	555	5.44	< 10	< 1.0	< 0.10	1.2	1.0	< 1.0	< 1.0	1.0	< 0	< 0	-63.5	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	15	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	8.4	< 0.005	< 0.001	< 0.50	< 0.50	< 0.0010	< 0.0010
	2018 05 15	< 5.0	< 2.0	< 0.50	413	5.63	< 10	< 1.0	0.29	1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 0	< 0	0	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 5.0	< 0.005	< 0.001	< 0.50	< 0.50	< 0.0010	< 0.0010
	2018 08 20	< 5.0	< 2.0	< 0.50	479	5.82	< 10	< 1.0	< 0.10	2.0	1.0	< 1.0	< 1.0	1.0	< 0	< 0	-81.9	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	0.083	0.090	7.3	0.0067	< 0.001	< 0.50	< 0.50	< 0.0010	< 0.0020
	2018 10 17	< 5.0	< 2.0	< 0.50	472	5.68	< 10	< 1.0	< 0.10	1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 0	< 0	0	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	0.052	0.052	28.5	< 0.005	< 0.001	< 0.50	< 0.50	0.0014	0.0029
Trip Blanks																																						
EV_BCgw	2018 02 15	< 5.0	< 2.0	< 0.50	508	5.42	< 10	< 1.0	< 0.10	1.3	1.0	< 1.0	< 1.0	1.0	< 0	< 0	-63.5	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	12	< 0.10	0.11	< 0.050	< 0.050	< 0.050	< 0.050	25.2	< 0.005	< 0.001	-	< 0.50	< 0.0010	< 0.0010
EV_BALgw	2018 05 24	< 5.0	< 2.0	< 0.50	387	5.58	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0	< 0	0	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	0.082	0.082	< 5.0	< 0.005	< 0.001	1.05	< 0.50	< 0.0010	< 0.0010
EV_GCgw	2018 10 23	< 5.0	< 2.0	< 0.50	394	5.61	< 10	< 1.0	< 0.10	2.6	< 1.0	< 1.0	< 1.0	< 1.0	< 0	< 0	62.6	< 0.050	< 0.50	< 20	< 0.30	-	< 0.050	-	< 0.0050	-	< 0.050	< 0.050	0.232	0.240	91.3	0.0079	< 0.001	-	< 0.50	< 0.0010	< 0.0020
EV_OCgw	2018 02 21	< 5.0	< 2.0	< 0.50	567	5.40	< 10	< 1.0	< 0.10	1.3	< 1.0	< 1.0	< 1.0	< 1.0	< 0	< 0	0	< 0.050	< 0.50	< 20	< 0.30	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	21.3	< 0.005	< 0.001	-	< 0.50	< 0.0010	< 0.0010
	2018 05 15	< 5.0	< 2.0	-	498	5.64	< 10	< 1.0	< 0.10	1.9	< 1.0	< 1.0	< 1.0	< 1.0	< 0	< 0	0	< 0.050	< 0.50	< 20	< 0.30	-	< 0.050	-	< 0.0050	-	< 0.050	< 0.050	< 0.050	< 0.050	8.1	< 0.005	< 0.001	< 0.50	< 0.50	< 0.0010	< 0.0010
	2018 08 20	< 5.0	< 2.0	< 0.50	450	5.85	< 10	< 1.0	< 0.10	2.1	< 1.0	< 1.0	< 1.0	< 1.0	< 0	< 0	0	< 0.050	< 0.50	< 20	< 0.30	-	< 0.050	-	< 0.0050	-	< 0.050	< 0.050	0.103	0.103	94.1	< 0.005	< 0.001	-	< 0.50	< 0.0010	< 0.0020
	2018 10 17	< 5.0	< 2.0	-	345	5.63	< 10	< 1.0	< 0.10	1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 0	< 0	0	< 0.050	< 0.50	< 20	< 0.30	-	< 0.050	-	< 0.0050	-	< 0.050	< 0.050	0.102	0.102	17.1	< 0.005	< 0.001	-	< 0.50	0.0011	0.0026

Associated data provided by Teck Coal Ltd.
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* RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL Denotes reported detection limit.

[a] Standard to protect freshwater aquatic life.
[b] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute").
[c] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic").
[d] Standard/guideline varies with Hardness.
[e] Standard/guideline varies with pH.
[f] Standard/guideline varies with Chloride.
[g] Standard/guideline varies with crop.
[h] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[i] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[j] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BOLD**	Concentration greater than BCWQG Aquatic Life Short-term Maximum (AW) guideline or BCWQG Aquatic Life Long-term Average (AW) guideline (applicable to EV_OCgw)
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 4 (Cont'd): Groundwater Analytical Results compared to Primary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Dissolved Metals																						
		Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[k] µg/L	Bismuth µg/L	Silicon µg/L
BC Standard/Guideline																										
CSR Aquatic Life (AW)[a]		90	50	10,000	1.5	12,000	0.5-4[d]	10[g]	40	20-90[e]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]	n/a	n/a
CSR Irrigation Watering (IW)		n/a	100	n/a	100	500-6,000[g]	5	5[g]	50	200	200	2,500	1	10	200	20	n/a	n/a	n/a	n/a	n/a	10	100	n/a	n/a	n/a
CSR Livestock Watering (LW)		n/a	25	n/a	100	5,000	80	50[g]	1,000	300	100	5,000	2	50	1,000	30	n/a	n/a	n/a	n/a	n/a	200	100	2,000	n/a	n/a
CSR Drinking Water (DW)		6	10	1,000	8	5,000	5	50[g]	20[h]	1,500	10	8	1	250	80	10	20	2,500	n/a	2,500	n/a	20	20	3,000	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[b]		n/a	5	n/a	n/a	n/a	0.038-2.8[d]	n/a	110	3.2-39.6[d]	3-417[d]	n/a	0.02[i]	2,000	n/a	n/a	0.1-3[d]	n/a	n/a	n/a	n/a	n/a	n/a	33-340[d]	n/a	n/a
BCWQG Aquatic Life Long-term Average (AW)[c]		9	n/a	1,000	0.13	1,200	0.018-0.457[d]	1 (Cr(+6))	4	2-10[d]	3-19.6[d]	n/a	n/a	1,000	25-150[d]	2	0.05-1.5[d]	n/a	0.8	n/a	n/a	8.5	n/a	7.5-187.5[d]	n/a	n/a
Field Blanks																										
EV_BCgw	2018 02 15	< 0.10	< 0.10	0.077	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0	< 0.050	< 50
EV_BALgw	2018 05 24	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	3.4	< 0.050	< 50
EV_GCgw	2018 10 23	< 0.10	< 0.10	0.19	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0	< 0.050	< 50
EV_OCgw	2018 02 21	< 0.10	< 0.10	< 0.050	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0	< 0.050	< 50
	2018 05 15	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	1.1	< 0.050	< 50
	2018 08 20	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0	< 0.050	< 50
	2018 10 17	< 0.10	< 0.10	0.14	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0	< 0.050	< 50
Trip Blanks																										
EV_BCgw	2018 02 15	< 0.10	< 0.10	< 0.050	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0	< 0.050	< 50
EV_BALgw	2018 05 24	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	-	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0	< 0.050	< 50
EV_GCgw	2018 10 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_OCgw	2018 02 21	< 0.10	< 0.10	< 0.050	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 3.0	< 0.050	< 50
	2018 05 15	-	-	-	-	-	-	-	-	-	-	-	0.00091	-	-	-	-	-	-	-	-	-	-	-	-	-
	2018 08 20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2018 10 17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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RDL Denotes reported detection limit.

[a] Standard to protect freshwater aquatic life.
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[c] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic").
[d] Standard/guideline varies with Hardness.
[e] Standard/guideline varies with pH.
[f] Standard/guideline varies with Chloride.
[g] Standard/guideline varies with crop.
[h] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[i] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[j] Total Mercury guideline is based on the % of MethylMercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg.
[k] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BOLD**	Concentration greater than BCWQG Aquatic Life Short-term Maximum (AW) guideline or BCWQG Aquatic Life Long-term Average (AW) guideline (applicable to EV_OCgw)
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE 5: Groundwater Analytical Results compared to Secondary Screening Criteria

Sample Location	Sample Date (yyyy mm dd)	Selenium µg/L
Groundwater Quality Criteria		
Guideline for Canadian Drinking Water Quality (DW)		50
Site Performance Objective: EV_ER1 (0200393)		19
Compliance Point: EV_MC2 (E300091)		28
Michel Creek		
EV_BCgw	2018 02 15	46.9
	2018 05 09	39
	2018 08 21	36.7
	2018 10 24	29.8
Elk River Distal to EVO		
EV_ER1gwS	2018 02 21	10.8
	2018 09 18	11.8
	2018 10 09	10.5
EV_ER1gwD	2018 02 21	10.1

Associated data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.

BOLD	Concentration greater than Canadian Drinking Water Quality guideline
UNDERLINE	Concentration greater than applicable Site Performance Objective
SHADED	Concentration greater than applicable Compliance Point

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Appendix II-5: Coal Mountain Operations 2018 Site-Specific Groundwater Monitoring Program

Summary

SRK Consulting completed the 2018 Annual Report for the CMO SSGMP (SRK, 2019). The following information was taken from the 2018 CMO Annual Report.

According to the groundwater conceptual site model (CSM) for CMO described by Teck (2018), hydrostratigraphy in the valleys includes a layer of clay overlying bedrock, and a thin layer of gravel overlying clay. The gravel layer and relatively shallow fractured or weathered bedrock are believed to be the main water bearing units. The clay layer may be acting as a confining unit, and/or a relatively low permeability aquitard allowing the shallow gravel to potentially be perched above the deeper bedrock.

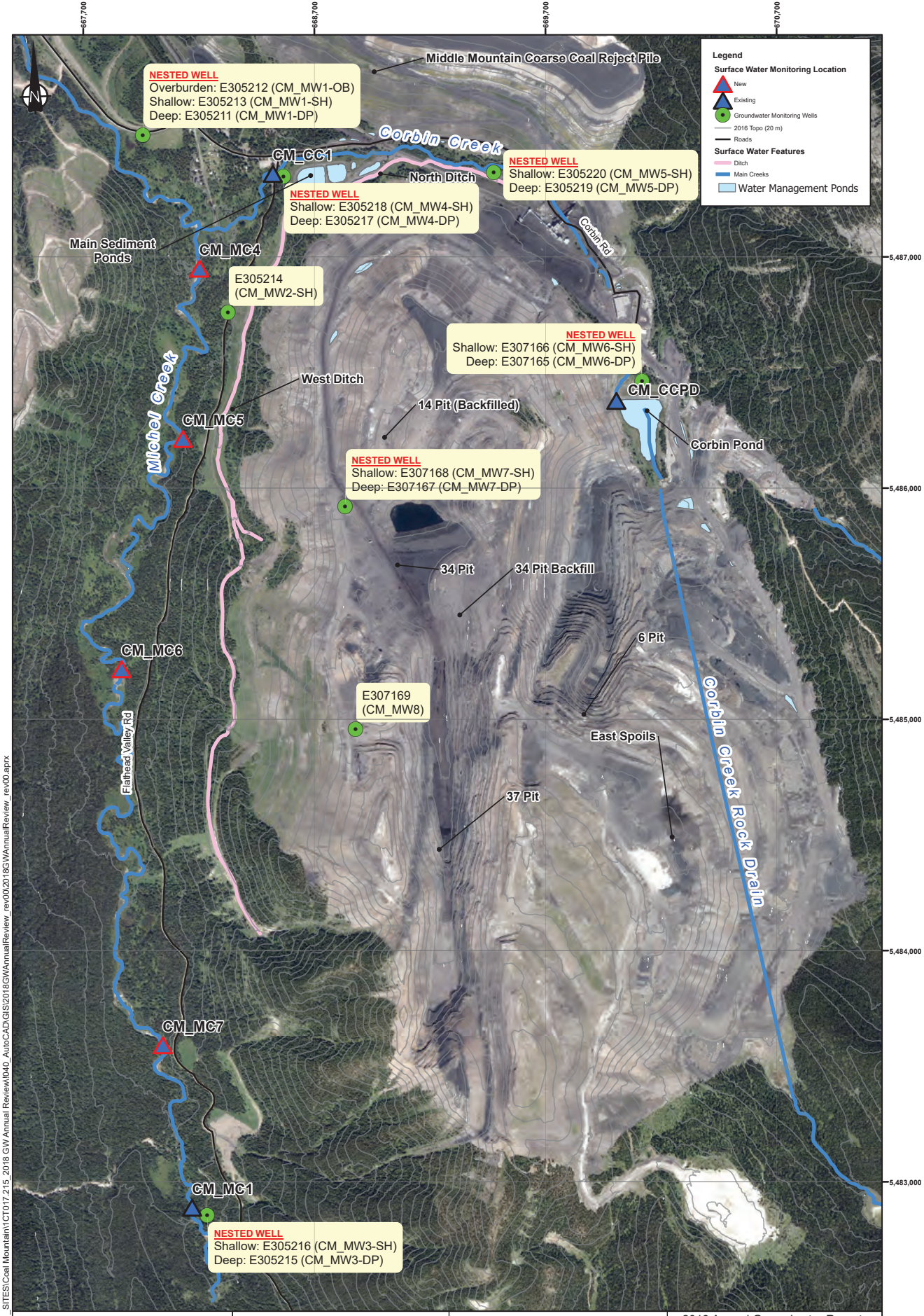
The CMO SSGMP includes a total of 15 monitoring wells which are monitored and sampled quarterly for a specific list of analytes. The wells monitored and sampled as part of the 2018 annual program are shown on Figure 1, attached. A summary of wells is provided in Table 3; field parameters in Table 10; and summary of primary and screening exceedances in Tables 11 and 12. Analytical results for select constituents of interest (CI), including cadmium, nitrate-nitrogen, sulphate and dissolved selenium, are shown on Figure 18 to 21, attached.

In general, while there have been some elevated groundwater concentrations measured near mine infrastructure (e.g. 34 Pit), mine influence on groundwater quality is considered to be relatively minor because concentrations of CI in groundwater are generally below secondary screening criteria for surface water provided in Permit 107517. Selenium concentration is increasing at CM_MW5-SH, which appears to be caused by increasing concentrations in Corbin Creek. There were some exceedances of secondary screening criteria (i.e. sulphate and nitrate) at CM_MW7-DP (located adjacent to the 34 Pit) but increasing visual trends in concentrations of CI over time were not readily apparent. Consistent with the conceptual site model, groundwater contributions to surface water are considered to be minor.

Recommendations

Recommendations for the SSGMP are to:

- Continue quarterly monitoring at all groundwater monitoring locations.
- Ensure that one travel blank is included in each sampling survey. This will help distinguish between sample contamination and laboratory error.
- Review sampling procedures to minimize potential contamination (as was the case for the field blank taken from CM_MW3-DP on 11/15/2018).
- Closely monitor parameters that appear to be increasing in certain wells. This includes fluoride in CM_MW1-SH, barium in CM_MW-DP, and selenium in CM_MW5-SH.


667,700
668,700
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Legend
Surface Water Monitoring Location
New
Existing
Groundwater Monitoring Wells
2016 Topo (20 m)
Roads
Surface Water Features
Ditch
Main Creeks
Water Management Ponds
Middle Mountain Coarse Coal Reject Pile
NESTED WELL
Overburden: E305212 (CM_MW1-OB)
Shallow: E305213 (CM_MW1-SH)
Deep: E305211 (CM_MW1-DP)
Corbin Creek
CM_CC1
North Ditch
NESTED WELL
Shallow: E305220 (CM_MW5-SH)
Deep: E305219 (CM_MW5-DP)
NESTED WELL
Shallow: E305218 (CM_MW4-SH)
Deep: E305217 (CM_MW4-DP)
Corbin Rd
Main Sediment Ponds
CM_MC4
E305214
(CM_MW2-SH)
NESTED WELL
Shallow: E307166 (CM_MW6-SH)
Deep: E307165 (CM_MW6-DP)
Michel Creek
West Ditch
CM_CCPD
14 Pit (Backfilled)
CM_MC5
Corbin Pond
NESTED WELL
Shallow: E307168 (CM_MW7-SH)
Deep: E307167 (CM_MW7-DP)
34 Pit
34 Pit Backfill
6 Pit
CM_MC6
E307169
(CM_MW8)
East Spoils
Flathead Valley Rd
Corbin Creek Rock Drain
37 Pit
CM_MC7
CM_MC1
NESTED WELL
Shallow: E305216 (CM_MW3-SH)
Deep: E305215 (CM_MW3-DP)
0 160 320 480 640
Meters
Note: Orthophoto is from 2018
and is provided by Teck, All coordinates
in UTM and contour interval is 20 m.
srk consulting
Job No: 1CT017.215
Filename: 2018GWAnnualReview_rev00
Teck
Coal Mountain
2018 Annual Groundwater Report
Site Layout
Date: March 2019
Approved: ROB
Figure: 1
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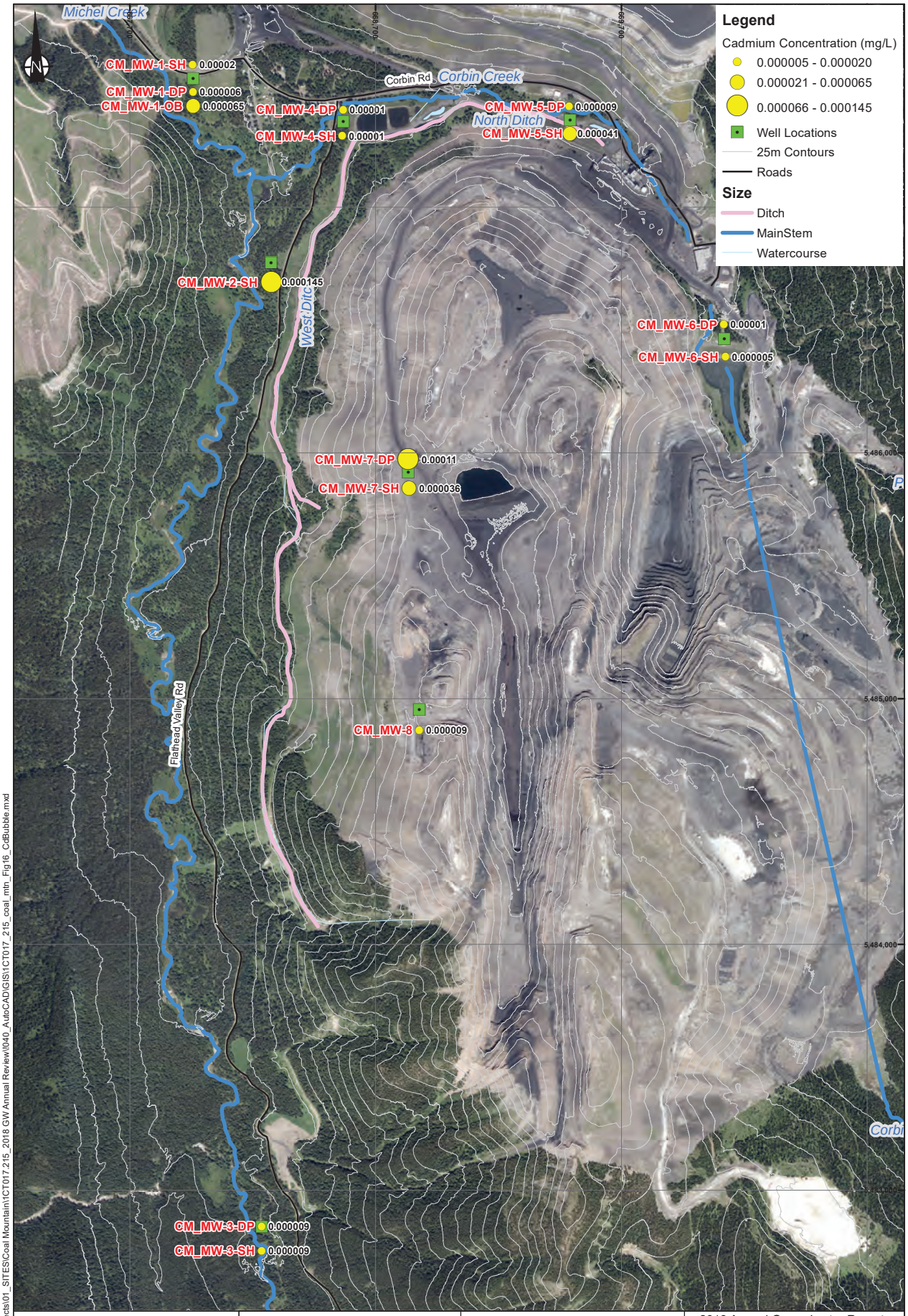

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Note: Orthophoto is from 2018 and is provided by Teck, All coordinates in UTM and 2016 contours interval is 25 m.

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Job No: 1CT017.215

Filename: 1CT017_215_coal_mtn_Fig16_CdBubble

Teck

Coal Mountain

2018 Annual Groundwater Report

Average Cadmium Concentrations in 2018 Monitoring Wells

Date:	Approved:	Figure:
March 2018	MSi	16

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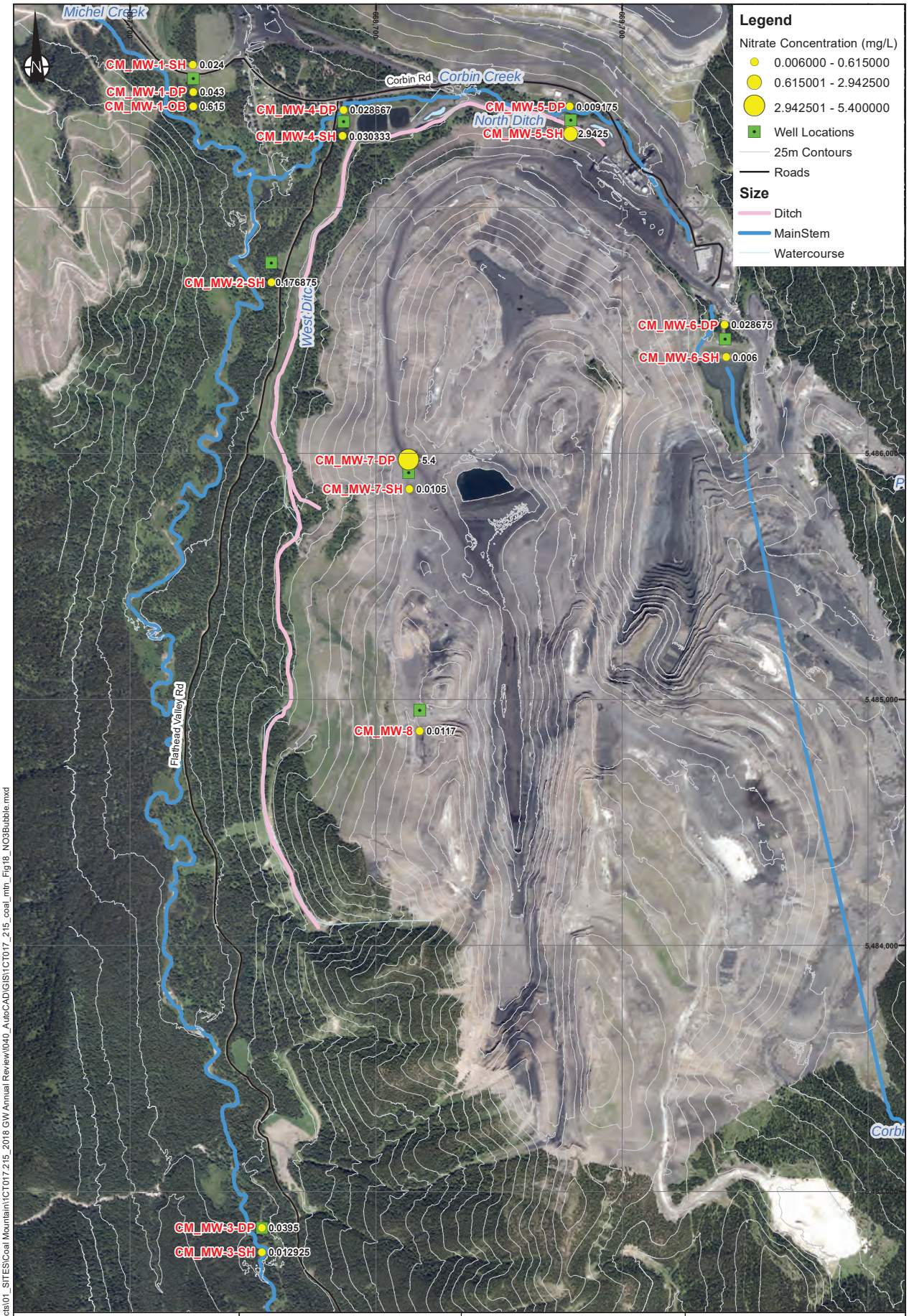

0 160 320 480 640 Meters

Note: Orthophoto is from 2018 and is provided by Teck, All coordinates in UTM and 2016 contours interval is 25 m.

srk consulting

Job No: 1CT017.215

Filename: 1CT017_215_coal_mtn_Fig18_NO3Bubble

Teck

Coal Mountain

2018 Annual Groundwater Report

Average Nitrate Concentrations in 2018 Monitoring Wells

Date:	Approved:	Figure:
March 2018	MSi	18

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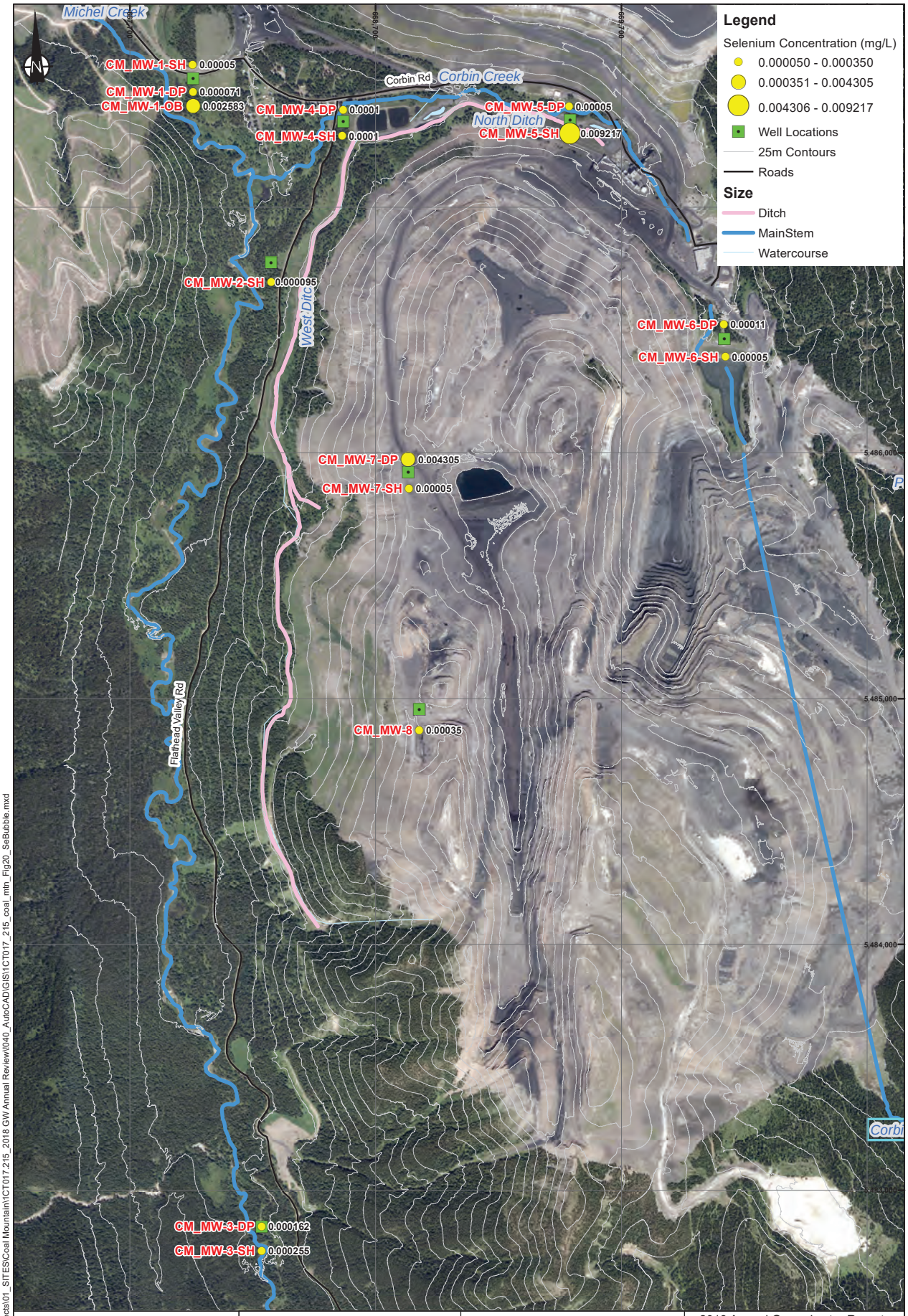

0 160 320 480 640 Meters

Note: Orthophoto is from 2018 and is provided by Teck, All coordinates in UTM and 2016 contours interval is 25 m.

srk consulting

Job No: 1CT017.215

Filename: 1CT017_215_coal_mtn_Fig20_SeBubble

Teck

Coal Mountain

2018 Annual Groundwater Report

Average Selenium Concentrations in 2018 Monitoring Wells

Date:	Approved:	Figure:
March 2018	MSi	20

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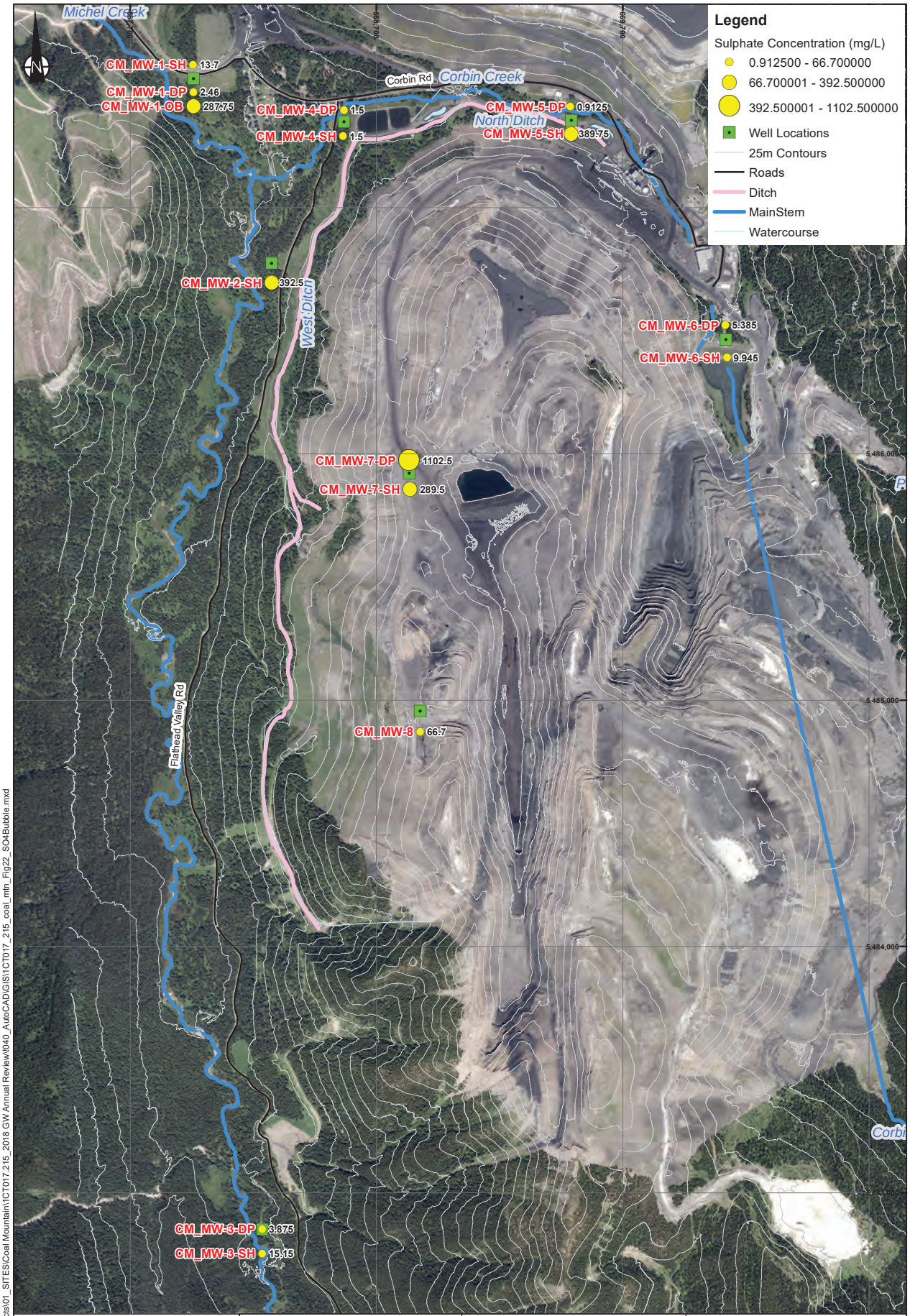

0 160 320 480 640 Meters

Note: Orthophoto is from 2018 and is provided by Teck, All coordinates in UTM and 2016 contours interval is 25 m.

srk consulting

Job No: 1CT017.215

Filename: 1CT017_215_coal_mtn_Fig22_SO4Bubble

Teck

Coal Mountain

2018 Annual Groundwater Report

Average Sulphate Concentrations in 2018 Monitoring Wells

Date:	Approved:	Figure:
March 2018	MSi	22

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Table 3: Summary of Groundwater Monitoring Locations

EMS ID	Site ID*	UTMs		Monitoring Program	Rationale	Hydraulic Conductivity (m/s)	Depth (mbgs)	Sampling/Water Level Monitoring Frequency[6]
		Easting	Northing					
E305211	CM_MW1-DP[1]	667958	5487527	Site and Elk Valley Regional	Furthest downgradient well from CMO. Provides information on valley lithology and groundwater (GW) quality, to the receiving environment from the mine, at different depths (deep bedrock, shallow bedrock and overburden).	$6.0x10^{-6}$	37.27	Quarterly
E305212	CM_MW1-OB[2]			Site and Elk Valley Regional		$6.6x10^{-5}$ to $1.2x10^{-4}$	4.39	Quarterly
E305213	CM_MW1-SH[3]			Site and Elk Valley Regional		$1.2x10^{-7}$ to $2.0x10^{-7}$	23.49	Quarterly
E305214	CM_MW2-SH	668327	5486758	Site	Downgradient of CMO in the Michel Creek Valley. Provides information on lithology and GW quality (influence from CMO dumps). Well is completed in overburden.	$6.9x10^{-5}$ – $2.6x10^{-4}$	4.43	Quarterly
E305215	CM_MW3-DP	668237	5482854	Site	Upgradient of CMO in the Michel Creek Valley. Provides information on lithology and background GW quality, at different depths (shallow bedrock and overburden).	$5.0x10^{-8}$ – $4.7x10^{-7}$	16.27	Quarterly
E305216	CM_MW3-SH			Site		$1.3x10^{-4}$ – $6.5x10^{-4}$	6.62	Quarterly
E305217	CM_MW4-DP	668566	5487348	Site	Downgradient of CMO in the Corbin Creek Valley. Provides information on lithology and GW quality influenced by main sediment pond at different depths (deep and shallow bedrock).	N/A[4]	28.19	Quarterly
E305218	CM_MW4-SH			Site		N/A[4]	19.05	Quarterly
E305219	CM_MW5-DP	669476	5487365	Site	Downgradient of CMO in the Corbin Creek Valley central. Provides information on lithology and GW quality influenced by 14 Pit and North ditch, at different depths (shallow bedrock and shallow overburden)	$2.2x10^{-6}$ – $5.1x10^{-6}$	25.86	Quarterly/Continuous
E305220	CM_MW5-SH			Site		$7.2x10^{-5}$ – $1.5x10^{-5}$	10.11	Quarterly/Continuous
E307166	CM_MW6-SH	670118	5486464	Site	Downgradient of Corbin Pond. Provides information on groundwater quality downgradient of Corbin Pond, spoils, and the Corbin rock drain at different depths (shallow bedrock and overburden).	$< 1x10^{-7}$	20.73	Quarterly
E307165	CM_MW6-DP			Site		$2x10^{-6}$	41.70	Quarterly
E307168	CM_MW7-SH	668833	5485920	Site	Within the mine footprint, northwest of 34 Pit. Provides information on the water level between 34 Pit and Michel Creek and on groundwater quality of seepage from 34 pit.	$\approx 3x10^{-5}$[5]	50.60	Quarterly
E307167	CM_MW7-DP			Site		$3x10^{-5}$	67.54	Quarterly
E307169	CM_MW8	668878	5484957	Site	Within the mine footprint, west of the northern end of 37 Pit. Provides information on the water level between 37 Pit and Michel Creek and on groundwater quality adjacent to 37 Pit.	$\approx 5x10^{-9}$[5]	104.02	Quarterly
-	CM_MC4	668202	5486954	SSGMP	**NEW** - Surface water station Michel Creek; will monitor for potential water quality impacts from 14 Pit, 34, Pit, 37 Pit, and West Spoils	-	-	Monthly
-	CM_MC5	668131	5486217	SSGMP	**NEW** - Surface water station Michel Creek; will monitor for potential water quality impacts from 14 Pit, 34, Pit, 37 Pit, and West Spoils	-	-	Bi-annual; Q2 and Q4
-	CM_MC6	667866	5485222	SSGMP	**NEW** - Surface water station Michel Creek; will monitor for potential water quality impacts from 14 Pit, 34, Pit, 37 Pit, and West Spoils	-	-	Bi-annual; Q2 and Q4
-	CM_MC7	668044	5483595	SSGMP	**NEW** - Surface water station Michel Creek; will monitor for potential water quality impacts from 14 Pit, 34, Pit, 37 Pit, and West Spoils	-	-	Bi-annual; Q2 and Q4

***Notes:**

1. DP = deep well completion (completed in bedrock)
2. OB = near surface overburden well completion
3. SH = shallow well completion (completed in overburden or bedrock, as noted)
4. N/A = Hydraulic tests not completed at CM_MW4 as they became flowing artesian once completed
5. **≈ =** Specific hydraulic tests not completed but estimate of hydraulic conductivity made from recovery time after development/purging
6. All water levels monitored quarterly at time of sampling with the exception of CM_MW5 where both wells have a sensor for continuous monitoring

Table 9: Average Calculated Hydraulic Gradients during 2017

Between Wells EMS (Site ID)	Value	Direction
E305211 (CM_MW1-DP) and E305213 (CM_MW1-SH)	0.037	Upwards
E305213 (CM_MW1-SH) and E305212 (CM_MW1-OB)	0.050	Downwards
E305215 (CM_MW3-DP) and E305216 (CM_MW3-SH)	0.035	Upwards
E305219 (CM_MW5-DP) and E305220 (CM_MW5-SH)	0.052	Downwards
E307165 (CM-MW6-DP) and E307166 (CM-MW6-SH)	0.122	Upwards
E307167 (CM-MW7-DP) and E307168 (CM-MW7-SH)	0.007	Upwards

4.2 Groundwater Quality

The results for parameters measured in the field are presented in Section 4.2.1. The results for parameters measured in the lab are presented in Section 4.2.2. Trends in groundwater quality were assessed qualitatively through an inspection of the graphed data.

Copies of the laboratory analysis certificates collated in Appendix B.

4.2.1 Field Measured Parameters

The results for parameters measured in the field are summarized in Table 10. In total, 58 samples had field pH, field temperature, field specific conductivity, and oxidation-reduction potential (ORP) measurements collected in 2018. All of the field pH measurements were circumneutral, ranging between 7.43 and 8.96. Specific conductivity was typically greater in deeper monitoring wells than shallow monitoring wells for nested installations. Most of the samples also had positive ORP measurements, indicating oxidizing conditions; some monitoring locations had variable positive and negative ORP measurements, with negative values typically occurring in summer or fall, indicating the possibility of reducing conditions during certain times of the year.

Table 10: Field Measured Parameters

EMS ID	Site ID	Date	pH	Specific Conductivity (µS/cm)	Temperature (°C)	ORP (mV)
E305211	CM_MW1-DP	3/22/2018	7.85	1262	4.93	-78
E305211	CM_MW1-DP	6/27/2018	7.87	1312	8.2	-145.1
E305211	CM_MW1-DP	9/19/2018	7.88	1210	6.2	-138.8
E305211	CM_MW1-DP	11/21/2018	7.77	1358	4.4	158.8
E305212	CM_MW1-OB	3/22/2018	7.28	1067	2.4	93.6
E305212	CM_MW1-OB	6/27/2018	7.2	557.4	11.2	123
E305212	CM_MW1-OB	9/19/2018	7.27	1392	9.37	140.3
E305212	CM_MW1-OB	11/21/2018	7.11	1536	4.4	171.1
E305213	CM_MW1-SH	3/22/2018	8.07	1177	3.06	-88.7

EMS ID	Site ID	Date	pH	Specific Conductivity (µS/cm)	Temperature (°C)	ORP (mV)
E305213	CM_MW1-SH	6/27/2018	7.91	1028	8.1	-166.3
E305213	CM_MW1-SH	9/19/2018	7.99	1048	6.9	-166.1
E305213	CM_MW1-SH	11/21/2018	8.27	1175	4.2	-122.9
E305214	CM_MW2-SH	3/27/2018	6.98	1214	2.39	103.5
E305214	CM_MW2-SH	6/25/2018	7.24	1309	8.5	70.1
E305214	CM_MW2-SH	9/18/2018	6.94	1300	10.7	168.4
E305214	CM_MW2-SH	11/15/2018	6.72	1240	4.6	191.3
E305215	CM_MW3-DP	3/27/2018	8.27	2836	2.57	-82.3
E305215	CM_MW3-DP	6/25/2018	8.43	2710	8.9	-155.9
E305215	CM_MW3-DP	9/20/2018	8.36	2777	4.4	-154.7
E305215	CM_MW3-DP	11/15/2018	8.39	2794	3.2	30.8
E305216	CM_MW3-SH	3/27/2018	7.72	326	2.1	106.3
E305216	CM_MW3-SH	6/25/2018	7.86	333.6	9.2	49
E305216	CM_MW3-SH	9/20/2018	7.84	324	4.55	60.5
E305216	CM_MW3-SH	11/15/2018	7.55	337.8	4	174.2
E305217	CM_MW4-DP	6/19/2018	8.25	2213	10	54
E305217	CM_MW4-DP	9/5/2018	8.17	2679	11.3	38.8
E305217	CM_MW4-DP	11/21/2018	8.05	2776	4.3	162.3
E305218	CM_MW4-SH	6/19/2018	8.16	1331	8.8	47
E305218	CM_MW4-SH	9/5/2018	8.15	1382	11.9	35
E305218	CM_MW4-SH	11/14/2018	7.9	1761	4.2	-79.4
E305219	CM_MW5-DP	3/21/2018	7.46	804	5.4	-73.5
E305219	CM_MW5-DP	6/19/2018	7.43	782	7.4	-87
E305219	CM_MW5-DP	9/20/2018	7.55	759	6.12	-70.7
E305219	CM_MW5-DP	11/14/2018	7.21	808	5.5	-110
E305220	CM_MW5-SH	3/21/2018	7.31	1308	5.2	14.7
E305220	CM_MW5-SH	6/19/2018	7.47	714.8	6.6	125.4
E305220	CM_MW5-SH	9/20/2018	7.32	1150	6.6	132.7
E305220	CM_MW5-SH	11/14/2018	7.05	1377	6.9	181.3
E307165	CM_MW6-DP	3/22/2018	8.38	1366	1.9	-141.4
E307165	CM_MW6-DP	6/18/2018	8.22	1308	7.8	119.9
E307165	CM_MW6-DP	9/17/2018	7.85	1288	8.7	-51.9
E307165	CM_MW6-DP	11/20/2018	8.02	1333	4.3	-39.7

EMS ID	Site ID	Date	pH	Specific Conductivity (µS/cm)	Temperature (°C)	ORP (mV)
E307166	CM_MW6-SH	3/22/2018	8.02	457	3.04	41.1
E307166	CM_MW6-SH	6/18/2018	8.06	446.5	7.6	-76.8
E307166	CM_MW6-SH	9/17/2018	7.91	446.2	7	-62.7
E307166	CM_MW6-SH	11/20/2018	7.88	446.3	4.7	-92.1
E307167	CM_MW7-DP	3/26/2018	6.97	2261	5.5	228.9
E307167	CM_MW7-DP	6/21/2018	7.12	2162	12.7	135.2
E307167	CM_MW7-DP	9/5/2018	7.14	2174	14.3	75.1
E307167	CM_MW7-DP	11/21/2018	6.9	2277	6.4	210.4
E307168	CM_MW7-SH	3/26/2018	7.38	798	6.7	-5.1
E307168	CM_MW7-SH	6/21/2018	7.45	1268	15.1	-73.7
E307168	CM_MW7-SH	9/5/2018	7.56	850	14	-35.6
E307168	CM_MW7-SH	11/21/2018	7.22	795	5.8	-48.4
E307169	CM_MW8	3/26/2018	7.49	670.8	5.5	198.6
E307169	CM_MW8	6/21/2018	7.44	738	11.7	27.1
E307169	CM_MW8	9/5/2018	7.79	672	11.9	112
E307169	CM_MW8	11/21/2018	7.34	658.2	6.2	-36.9

4.2.2 Lab Measured Parameters

The groundwater sampling locations are shown in Figure 1. CMO's groundwater data was compared to the BC CSR water quality standards for aquatic life (AL), drinking water (DW), livestock (LW), and irrigation (IW). In 2018, 81 results were elevated above at least one of the CSR standards (Table 11). Seven results were elevated above secondary screening criteria (Table 12), including two for nitrate and five for sulphate. Note that the two results for nitrate did not exceed any CSR standards, as they are all lower than the nitrate limit specified in Permit 107517.

The reduction in the drinking water guideline for lithium from 730 to 8 µ/L results in some samples failing to meet this criterion. Of 58 samples, only 5 are below this guideline (four from CM_MW7-SH (all quarters) and one from CM_MW3-SH (Q2)).

Time series plots for the COIs and the parameters elevated above the BC CSR water quality guidelines and/or secondary guidelines, either in 2018 or previous years, are presented in the subsequent subsections

Table 11: Summary of Primary Screening Exceedances

Parameter	Unit	Range of Detectable Concentrations	CSR AL Standard	# of Samples > AL	CSR DW Standard	# of Samples > DW	CSR IW Standard	# of Samples > IW	CSR LW Standard	# of Samples > LW
Barium	mg/L	0.0127 - 10.6	10	2/8	1	8/8	-	8/8	-	8/8
Boron	mg/L	0.019 - 0.534	12	0/1	5	0/1	0.5	0/1	5	0/1
Cobalt	mg/L	0.0001 - 0.00204	0.04	0/2	0.001	2/2	0.05	2/2	1	2/2
Lithium	mg/L	0.0067 - 1.29	-	0/53	0.008	53/53	2.5	0/53	5	0/53
Manganese	mg/L	1.19 - 135	-	0/9	1.5	0/9	0.2	0/9	-	0/9
Molybdenum	mg/L	0.00013 - 0.0634	10	0/4	0.25	0/4	0.01	0/4	0.05	0/4
Selenium	ug/L	0.05 - 11	20	0/2	10	2/2	20	2/2	30	2/2
Sodium	mg/L	4.02 - 689	#N/A	0/18	200	18/18	-	18/18	-	18/18
Strontium	mg/L	0.208 - 5.51	-	0/4	2.5	4/4	-	4/4	-	4/4
Zinc	mg/L	0.001 - 0.194	-	4/4	3	0/4	5	0/4	2	0/4
Chloride	mg/L	1.38 - 811	1500	0/20	250	7/20	100	7/20	600	7/20
Fluoride	mg/L	0.063 - 1.55	-	0/4	1.5	3/4	1	3/4	1	3/4
Sulphate	mg/L	0.45 - 1210	-	0/5	500	5/5	-	0/5	1000	4/5

Table 12: Summary of Secondary Screening Exceedances

Date	EMS ID	Location Code	Parameter	Result	Unit	Criteria Value	Criteria
3/26/2018	E307167	CM_MW7-DP	Nitrate	6.18	mg/L	5	Permit 107517
6/21/2018	E307167	CM_MW7-DP	Nitrate	7.22	mg/L	5	Permit 107517
11/14/2018	E305220	CM_MW5-SH	Sulphate	516	mg/L	500	Permit 107517
3/26/2018	E307167	CM_MW7-DP	Sulphate	1120	mg/L	500	Permit 107517
6/21/2018	E307167	CM_MW7-DP	Sulphate	1210	mg/L	500	Permit 107517
9/5/2018	E307167	CM_MW7-DP	Sulphate	1060	mg/L	500	Permit 107517
11/21/2018	E307167	CM_MW7-DP	Sulphate	1020	mg/L	500	Permit 107517

Cadmium

Cadmium data are presented in Figure 15. All results were below CSR standards. Cadmium results in both CM_MW7-SH and CM_MW7-DP have dropped since 2017. Other than this, no significant deviations from previous years are observed in 2018.

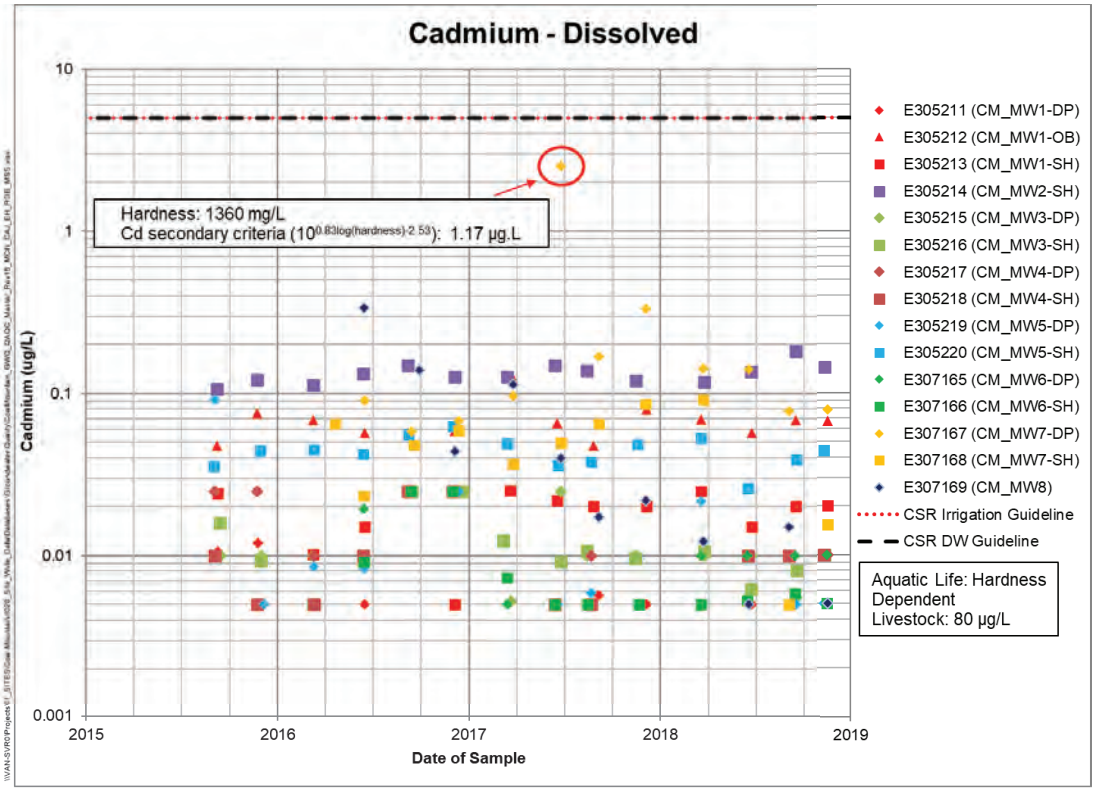

Figure 15: Dissolved Cadmium Concentrations

Appendix II-6: Quality Assurance/Quality Control (QA/QC)

SNC-Lavalin received field and chemistry data from the Site Specific Groundwater Monitoring Programs (SSGMPs) for wells relevant to the Regional Groundwater Monitoring Program (RGMP) including supplemental wells utilized in this RGMP (including both manual and level logger groundwater levels, top of casing information, field measurements and laboratory analytical results, where applicable). SNC-Lavalin has relied on data and information provided by Teck and, as such, has assumed that the information provided is both complete and accurate. Interpretations and conclusions within this report are made with the assumption that data collection was performed in accordance with Permit 107517, the British Columbia Field Sampling Manual[1], and Teck's Standard Practice and Procedures (SP&P).

The QA/QC assessment completed for the relevant SSGMP wells included shipping and handling issues, summarized results of relative percent differences (RPDs) from duplicate samples, and any detection of analytes in field blanks. Results of the QA/QC program are summarized in the following sections.

Shipping and Handling Issues

A summary of shipping and handling issues is provided in Table II-1 below.

Table II-1: Summary of Shipping and Handling Issues

Operation	Well ID	Q	Issue	Rationale
Samples were not received by the laboratory on time				
GHO	GH_GA-MW-1	1	The 72 hour hold-time for turbidity, dissolved orthophosphate, nitrate, and nitrite was exceeded.	Samples were shipped to the Burnaby laboratory and were received three days after sampling. As a result the laboratory was unable to complete the analysis on time.
	GH_GA-MW-2 GH_GA-MW-4	1	The 72 hour hold-time for nitrate and nitrite was exceeded.	Samples were received two days after sampling, and as a result, the laboratory was unable to complete the analyses within the required hold-time.
	GH_GA-MW-3 GH_GWB3 (field blank)	1	The 72 hour hold-time for turbidity, dissolved orthophosphate, nitrate and nitrite was exceeded.	Samples were received six days after sampling and, as a result, the samples had already exceeded their required hold-times.

[1] Clark, M.J.R. (editor). 2013. *British Columbia Field Sampling Manual.* Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection, Victoria, BC, Canada. 312 pp.

Table II-1 (Cont'd): Summary of Shipping and Handling Issues

Operation	Well ID	Q	Issue	Rationale
Samples were received by the laboratory on time				
FRO	FR_GH_WELL4	2	Total phosphorus hold-time was exceeded by 28 days prior to analysis.	Samples were received two days after sampling. The laboratory failed to complete analysis within the hold time and was completed on day 29.
	FR_09-01-A FR_09-01-B FR_GH_WELL4	3	Nitrate and nitrite hold-time was exceeded by one day prior to analysis, except for FR_GH_WELL4, which was re-analyzed on day fourteen.	The laboratory conducted the initial testing within the hold-time; however, failed to complete the re-analysis or dilution within the recommended hold-time, but initial testing was conducted within hold time. The samples arrived one day after sampling (i.e., within hold time). The laboratory failed to complete subsequent analyses within the three day hold time and re-analyses were completed on day four for all but nitrate in FR_GH_WELL4 which was re-analysed on day fourteen.
GHO	GH_MW-PC	2	Total phosphorus hold-time was exceeded by one day prior to analysis.	Laboratory failed to complete analysis within hold time. Due to overcapacity at the Calgary location, the laboratory sublet the analysis to the Edmonton Laboratory.
	GH_MW-PC and duplicate GH_LRP1 (field blank)	3	Nitrate and nitrite hold-time was exceeded by one day prior to analysis.	Laboratory failed to complete analysis within hold time. Due to instrument issues, the laboratory sublet the analysis to the Burnaby Laboratory in August 2018.
	GH_MW-PC	4	Dissolved orthophosphate hold-time was exceeded by one day prior to analysis.	The laboratory conducted the initial testing within the hold-time; however, failed to complete the re-analysis or dilution within the recommended hold-time.
	GH_GA-MW-1 GH_GA-MW-4	3	Nitrate and nitrite hold-time was exceeded by one day prior to analysis.	Laboratory failed to complete analysis within hold time. Due to instrument issues, the laboratory sublet the analysis to the Burnaby Laboratory in August 2018.
LCO	LC_PIZDC1307 LC_PIZD1308	3	Nitrate and nitrite hold-time was exceeded by 8 and 9 days, respectively, prior to analysis.	Laboratory failed to complete analysis within hold time. Due to instrument issues, the laboratory sublet the analysis to the Burnaby Laboratory in August 2018.
EVO	EV_MC7GW (trip blank)	4	Nitrate and nitrite hold times were exceeded by six days prior to analysis.	The laboratory conducted the initial testing within the hold-time; however, failed to complete the re-analysis or dilution within the recommended hold-time.
	EV_MCgwS EV_MCgwD	3	Alkalinity hold-time was exceeded by seven days prior to analysis.	The laboratory conducted the initial testing within the hold-time; however, failed to complete the re-analysis or dilution within the recommended hold-time.

Table II-1 (Cont'd): Summary of Shipping and Handling Issues

Operation	Well ID	Q	Issue	Rationale
Samples were received by the laboratory on time				
CMO	CM_MW3-SH duplicate CM_NNT_WS (field blank) CM_TRP_WS (trip blank)	2	Total phosphorus hold-time was exceeded by 28 days prior to analysis.	Samples were received one day after sampling. The laboratory failed to complete the analysis within the hold time and was completed on day 29.

FRO, GHO, LCO, EVO, and CMO denotes Fording River Operations, Greenhills Operations, Line Creek Operations, Elkview Operations, and Coal Mountain Operations, respectively.

All laboratory measured pH and oxidation-reduction potential (ORP) exceeded a hold time of 15 minutes. These measurements are collected in the field provide a reliable measurement. The hold time exceedances are not expected to influence the interpretation of the data; which are discussed in detail where relevant in Section 4 of the report.

Results from 2018 for these parameters were similar to historical results; therefore, exceedances of hold times were not identified as an issue. Furthermore, with the exception of nitrate in select samples, concentrations of these parameters have historically been low in groundwater samples.

Duplicate Samples

Duplicate samples were collected at a frequency of at least one per ten samples during sampling events to assess the precision of the field sampling methodology and consistency of laboratory analysis. Duplicate samples were evaluated by calculation of the RPD of the concentration between the sample and duplicate, as follows:

RPD = (original value - duplicate value)/[(original value + duplicate value)/2] *100

RPDs are calculated for parameters where at least one of the samples was greater than five times the laboratory detection limit (DL); an RPD of less than 20% for metals and inorganics is considered as an acceptable level of precision as per the BC Field Sampling Manual[2]. Teck have a QA/QC program based on this manual; where the result is less than five times the DL, the acceptable RPD will be modified as follows:

- RPD of < 20% = Acceptable;
- RPD of > 20% with results > 5 times the DL = Indicate a possible problem; and
- RPD of >50% with results > 5 times the DL = Indicates a definite problem, most likely contamination or lack of sample representativeness.

Table II-2 below summarizes the number of sample duplicates for wells included in the RGMP and any RPDs above acceptable levels (RPD > 50% with results > 5 times the detection limit).

[2] Clark, M.J.R. (editor). 2013. *British Columbia Field Sampling Manual.* Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection, Victoria, BC, Canada. 312 pp

Table II-2: Summary of Duplicate Sample Results above Acceptable Levels

Operation	Number of Duplicates Included in the RGMP	Summary of RPDs above Acceptable Levels
FRO	1	All RPDs were considered acceptable.
GHO	1	All RPDs were considered acceptable.
LCO	1	All RPDs were considered acceptable.
EVO	5	RPD value above acceptable level for laboratory measured turbidity at EV_OCgw (Q2).
CMO	7	RPD value above acceptable level for sulphate (100%) at CM-MW3-DP (Q2). RPD value above acceptable level for total phosphorus (as P) (122%) at CM_MW1-SH (Q4).

The RPD above the acceptable level for turbidity is not expected to influence results as turbidity can differ significantly between the sample and its duplicate. This parameter is prone to high variability because they are measures of suspended particles, which are dependent on turbulence and mixing at the time of sample collection. In addition, no applicable primary screening criteria exists for this parameter. Concentrations of sulphate at CM_MW3-DP have historically been less than the applicable primary screening criteria. In Q2, the concentration of sulphate at this well remained low, consistent with historical results. Overall, these results indicate low variability in constituent concentrations from sampling and handling

Field Blanks

Teck's standard practice for collecting field blank samples is to open a designated field blank sample bottle pre-filled with ultra-pure de-ionized (DI) water and preservative (where applicable) at the sampling site during regular sample collection. Field blanks provide information on contamination resulting from the handling technique and atmospheric contamination. In 2018, 15 field blanks were collected (three in Q1, four in each of Q2, Q3, and Q4). A summary of field blank sample results above the DLs is provided in Table II-3.

Table II-3: Summary of Field Blank Samples with Parameters above Detection Limit

Operation	Associated Well	Quarter	Parameter Above Detection Limit	Value	Detection Limit
FRO	FR_09-01B	Q4	**Ammonia as N**	**616 µg/L**	**5 µg/L**
GHO	GH_MW-PC	Q3	**Total kjeldahl nitrogen (TKN)**	**0.319 mg/L**	**0.05 mg/L**
			Ammonia as N	**271 µg/L**	**5 µg/L**
			Dissolved orthophosphate	0.0011 mg/L	0.0010 mg/L
LCO	LC_PIZP1101	Q2	TKN	0.198 mg/L	0.05 mg/L
			Ammonia as N	**340 µg/L**	**5 µg/L**

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Table II-3 (Cont'd): Summary of Field Blank Samples with Parameters above Detection Limit

Operation	Associated Well	Quarter	Parameter Above Detection Limit	Value	Detection Limit
EVO	EV_OCgw	Q1	Total alkalinity	1 mg/L	1 mg/L
			Ammonia as N	8.4 µg/L	5 µg/L
			Dissolved iron	15 µg/L	10 µg/L
		Q2	Turbidity	0.29 NTU	0.10 NTU
			Dissolved zinc	1.1 µg/L	10 µg/L
		Q3	Total alkalinity	1.0 mg/L	1.0 mg/L
			Ammonia as N	7.3 µg/L	5 µg/L
			TKN	0.083 mg/L	0.05 mg/L
			Nitrate as N	0.0067 mg/L	0.005 mg/L
		Q4	**Ammonia as N**	**28.5 µg/L**	**5 µg/L**
			TKN	0.052 mg/L	0.05 mg/L
			Dissolved ortho-phosphate	0.0014 mg/L	0.001 mg/L
			Total phosphorus as P	0.0029 mg/L	0.002 mg/L
			Dissolved barium	0.14 µg/L	0.10 µg/L
	EV_BCgw	Q1	Turbidity	0.18 NTU	0.10 NTU
			Dissolved barium	0.077 µg/L	0.10 µg/L
CMO	CM-MW1-OB	Q3	Turbidity	0.13 NTU	0.10 NTU
			Ammonia as N	**26.8 µg/L**	**5 µg/L**
			Dissolved chromium	0.23 µg/L	0.10 µg/L
			Dissolved lead	**0.472 µg/L**	**0.050 µg/L**
	CM-MW1-SH	Q1	Ammonia as N	8.1 µg/L	5 µg/L
			Dissolved barium	0.050 µg/L	0.10 µg/L
	CM-MW1-DP	Q2	**TKN**	**0.698 mg/L**	**0.05 mg/L**
			Dissolved manganese	0.12 µg/L	0.10 µg/L
	CM_MW3-SH	Q3	Turbidity	0.23 NTU	0.10 NTU
			Ammonia as N	15.0 µg/L	5 µg/L
			Dissolved aluminum	**18.6 µg/L**	**3.0 µg/L**
			Dissolved antimony	0.19 µg/L	0.10 µg/L
			Dissolved barium	**0.83 µg/L**	**0.10 µg/L**
			Dissolved cadmium	0.0084 µg/L	0.0050 µg/L
			Dissolved calcium	0.193 mg/L	0.050 mg/L
			Dissolved iron	21 µg/L	10 µg/L
			Dissolved lead	**4.69 µg/L**	**0.050 µg/L**
			Dissolved manganese	**1.61 µg/L**	**0.10 µg/L**
			Dissolved sodium	0.110 mg/L	0.050 mg/L
			Dissolved strontium	0.66 µg/L	0.20 µg/L
			Dissolved tin	0.38 µg/L	0.10 µg/L
			Dissolved zinc	4.2 µg/L	3.0 µg/L

Table II-3 (Cont'd): Summary of Field Blank Samples with Parameters above Detection Limit

Operation	Associated Well	Quarter	Parameter Above Detection Limit	Value	Detection Limit
CMO (cont'd)	CM_MW3-DP	Q2	Ammonia as N	7.3 µg/L	5 µg/L
		Q4	**Hardness**	**164 mg/L**	**0.50 mg/L**
			Turbidity	0.17 NTU	0.10 NTU
			Ammonia as N	16.1 µg/L	5 µg/L
			Dissolved barium	**82.2 µg/L**	**0.10 µg/L**
			Dissolved boron	21 µg/L	10 µg/L
			Dissolved cadmium	0.0087 µg/L	0.0050 µg/L
			Dissolved calcium	**46.8 mg/L**	**0.050 mg/L**
			Dissolved chromium	0.27 µg/L	0.10 µg/L
			Dissolved copper	1.84 µg/L	0.50 µg/L
			Dissolved lead	**0.285 µg/L**	**0.050 µg/L**
			Dissolved lithium	**7.9 µg/L**	**1.0 µg/L**
			Dissolved magnesium	**11.6 µg/L**	**0.10 µg/L**
			Dissolved manganese	**11.2 µg/L**	**0.10 µg/L**
			Dissolved molybdenum	**0.983 µg/L**	**0.050 µg/L**
			Dissolved potassium	**0.694 µg/L**	**0.050 µg/L**
			Dissolved selenium	0.186 µg/L	0.050 µg/L
			Dissolved sodium	**3.96 µg/L**	**0.050 µg/L**
			Dissolved strontium	**289 µg/L**	**0.20 µg/L**
			Dissolved uranium	**0.210 µg/L**	**0.010 µg/L**
			Dissolved zinc	**28.2 µg/L**	**1.0 µg/L**

BOLD – Parameter concentration is greater than five times the analytical detection limit.

Fourteen of the 15 field blanks contained detectable parameters in 2018; however, only eight of these wells contained concentrations of select parameters greater than five times the associated DL (i.e., the reliable detection limit). Several measureable dissolved ions were measured in field blanks collected from CM_MW3-SH and CM_MW3-DP. The presence of measureable concentrations in these samples is indicative of contamination during the field procedure with detectable turbidity indicating sediment contaminated the sample (i.e., filter breakthrough).

The remaining six sample locations had measureable concentrations of ammonia as N, TKN, and/or dissolved lead. Overall, detectable concentrations of ammonia, TKN, and dissolved lead in select field blanks were also greater than measured values in groundwater at the corresponding sampling locations. Similar detections were measured in unopened trip blanks (see sub-section below) and in some instances where concentrations were greater than measured values in groundwater at the corresponding sampling locations. In addition, similar detectable parameters in field and trip blanks from groundwater monitoring were reported in 2017. SNC-Lavalin contacted the laboratory to determine the source(s) of parameters above the DLs. Although the field blanks could not be re-analyzed due to hold-time exceedances, the laboratory provided the results of ultra-pure de-ionized (DI) water for select months in 2018; however, concentrations of these parameters were not detected. The laboratory investigated possible sources of parameters above DLs including review of the quality control and method blanks from

the specific analysis batches, source material used for preservatives, and previous instances of confirmed contamination of sample containers. Based on the laboratory investigation, concentrations of parameters above the DL in field blanks were not sourced from the laboratory. There is a possibility that the detectable concentrations of select parameters are due to low level introduction of these parameters in the field or in shipping and handling. It is noted that all concentrations measured in field blanks are below the lowest applicable groundwater standard and the detectable concentrations of parameters are not considered to be a concern for data reliability.

Trip Blanks

Standard practice for trip blanks consists of ordering bottles with ultra-pure DI water and preservative (where applicable) from the lab, which are kept in a dedicated cooler and are unopened throughout the sampling event. Trip blanks are meant to detect widespread contamination from the container and preservative during transport and storage. Trip blanks accompany each sampling event and the analytical results of the trip blanks are assessed for possible contamination. In 2018, the collection of eight trip blanks (four in Q1, two in Q2, one in Q3, one in Q4) coincided with sampling of RGMP wells. All parameters on the RGMP analyte list were analyzed with the exception of dissolved organic carbon (DOC) at LCO (Q1) and EVO (Q1, Q3 and Q4), and dissolved metals at LCO (Q1 and Q2) and EVO (Q2 through Q4). A summary of trip blank sample results above the DLs is provided in Table II-4.

Table II-4: Summary of Trip Blank Sample Results with Parameters above Detection Limit

Operation	Quarter	Date	Parameter Above Detection Limit	Value	Detection Limit
FRO	Collection of trip blanks did not coincide SSGMP well sample collections associated with the RGMP.				
GHO	No trip blanks were collected as part of the 2018 monitoring program.				
LCO	Q1	March 20	Ammonia as N	6.8 µg/L	5 µg/L
	Q2	June 19	**Ammonia as N**	**232 µg/L**	**5 µg/L**
			TKN	0.083 mg/L	0.05 mg/L
			Dissolved ortho-phosphate	0.0022 µg/L	0.0010 µg/L
EVO	Q1	February 15	**Ammonia as N**	**25.2 µg/L**	**5 µg/L**
			Dissolved Iron	12 µg/L	10 µg/L
			Dissolved Manganese	**11 µg/L**	**0.10 µg/L**
		February 21	Ammonia as N	21.3 µg/L	5 µg/L
	Q2	May 15	Ammonia as N	8.1 µg/L	5 µg/L
			Dissolved mercury	0.00091 µg/L	0.0050 µg/L
	Q3	August 20	**Ammonia as N**	**94.1 µg/L**	**5 µg/L**
			TKN	0.103 mg/L	0.05 mg/L
	Q4	October 17	Ammonia as N	17.1 µg/L	5 µg/L
			TKN	0.102 mg/L	0.05 mg/L
			Dissolved ortho-phosphate	0.0011 µg/L	0.0010 µg/L
			Total phosphorus as P	0.0026 µg/L	0.0010 µg/L
CMO	No trip blanks were collected as part of the 2018 monitoring program.				

BOLD – Parameter concentration is greater than five times the analytical detection limit.

The detectable concentrations in trip blanks are similar to the results for the field blanks, ammonia as N and dissolved manganese higher than concentrations in the field blanks or groundwater samples collected at the corresponding locations. As indicated in the previous sub-section, the laboratory investigations did not identify the source(s) of parameters measured above the DLs from the laboratory. Overall, the detectable concentrations of parameters are not considered to affect the reliability of the data.

Laboratory QA/QC

The detailed results of laboratory QA/QC are included in Certificates of Analysis reported in the respective 2018 SSGMP Reports[3,4,5,6,7]. The Quality Control Reports noted the following for some samples:

- Matrix Spike recovery could not be accurately calculated for some constituents due to high analyte background in sample;
- DLs were raised due to dilution required due to high concentration of test analyte(s), analyte was detected at a comparable level in the method blank, high dissolved solids/electrical conductivity, or sample matrix effects (e.g., chemical interference, colour, turbidity);
- TKN results were likely biased low due to nitrate interference. Nitrate-N is > 10x TKN;
- Method blank exceeded ALS data quality objectives (DQO). Limits of reporting were adjusted for samples with positive hits below 5x blank level;
- DLs were adjusted for required dilution;
- Reported result was verified by repeat analysis;
- Result confirmed after data review;
- Lab control sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, it reported, have been qualified;
- Analytical hold-time was exceeded;
- Dissolved concentrations exceeds total. Results were confirmed by re-analysis;
- Hold-time was exceeded for re-analysis or dilution, but the initial testing was conducted within the hold time; and
- DQO was marginally exceeded (by < 10% absolute) for < 10 % of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per Canadian Council of Ministers of the Environment [CCME]).

These notes are not unusual for these analyses and the results of the laboratory QA/QC were considered to be acceptable for the purpose of this assessment.

[3] Golder Associates Ltd., 2019. Site Specific Groundwater Monitoring: 2018 Annual Report, Teck Coal Limited – Line Creek Operations. Report prepared for Teck Coal Ltd., dated March 2019.
[4] SNC-Lavalin Inc., 2019. 2018 Site-Specific Groundwater Monitoring Report, Fording River Operations. Report prepared for Teck Coal Ltd., dated March 28, 2019.
[5] SNC-Lavalin Inc., 2019. 2018 Site-Specific Groundwater Monitoring Report, Greenhills Operations. Report prepared for Teck Coal Ltd., dated March 28, 2019.
[6] SNC-Lavalin Inc., 2019. 2018 Site-Specific Groundwater Monitoring Report, Elkview Operations. Report prepared for Teck Coal Ltd., dated March 28, 2019.
[7] SRK Consulting Inc., 2019. 2018 Site Specific Groundwater Monitoring Annual Report: Coal Mountain Operations. Report prepared for Teck Coal Ltd., dated March 2019.

In addition to the results above, ALS reported that the dissolved concentration of dissolved manganese (0.00363 mg/L) and selenium (1.61 µg/L) concentrations in groundwater from GH_MW-RLP-1D (Q2) exceeded total concentrations for the field-filtered sample. This suggests metallic contaminants may have been introduced to dissolved sample during field filtration for this sample. The qualifier suggests that concentrations of these parameters are interpreted to be biased high. These concentrations measured at GH_MW-RLP-1D in Q2 were at least one magnitude lower than the applicable criteria and are considered acceptable for reporting purposes.

No vial for dissolved mercury analysis was submitted for CM_MW1-OB (Q4) and water from the routine bottle was filtered and preserved in the laboratory in order to measure mercury.

The Certificate of Analyses (COAs) for samples from GH_MW-RLP-1D (Q4), LCO_PIZDC1307 (Q3 and Q4), LCO_PIZDC108 (Q3 and Q4), and LCO_PIZP1101 (Q3 and Q4), indicate that these samples were filtered and preserved for dissolved metals and DOC in the laboratory approximately 3 to 5 days after sampling, which is within the required holds times for laboratory filtering (within 6 to 10 days of sampling) and preservation (within 14 days of sampling). Due to the potential of precipitation, a potential does exist that concentrations of dissolved metals are biased low; therefore it is best practice to filter and preserve samples in the field. It is noted that concentrations of dissolved metals and DOC in these samples were consistent with historical results and as such this practice did not affect the interpretation.

A review of the QA portion of the laboratory analytical reports did not identify any additional QA/QC issues.

QA/QC Summary

QA/QC data relating to the RGMP and reported in the SSGMPs were considered acceptable. A summary of the QA/QC results is as follows.

- Hold time exceedances, RPDs above acceptable levels and samples that samples that were lab filtered are not expected to influence interpretation of results;
- RPDs above acceptable levels are not expected to influence the interpretation of results;
- Detectable concentrations were measured in field and trip blank samples, but were not considered to affect the reliability of results;
- Metallic contaminants potentially introduced into the dissolved sample at GH_MW-RLP-1D in Q2 (GHO) may have biased the concentrations for dissolved manganese and selenium high. This is not considered to affect the reliability of the results, as the concentrations remained more than one magnitude less than the applicable criteria. In addition, metallic contaminants may have also been introduced during sample collection at CMO in Q3 and Q4 (as evidenced by detectable dissolved metals in the field blank). Concentrations of Cl at CMO wells during these quarters remained less than the applicable criteria;
- Results from samples that were lab filtered and preserved rather than in the field are not considered to affect the reliability of the results;
- Several parameters (including dissolved metals suite) were not collected in trip blanks at EVO and LCO; and
- Trip blanks were not collected during any of the quarters in 2018 at GHO and CMO.

SNC-Lavalin recommends adding trip blanks to GHO and CMO sampling programs and continuing to use trip and field blanks at FRO, LCO and EVO. All analytes listed required in the RGMP should be analyzed for in trip and field blanks so that results can be monitored for the possibility of introduction of parameters in the field. In addition, SNC-Lavalin recommends GHO and CMO review their methodology to reduce the potential for cross-contamination sampling procedures.

Appendix III

Borehole Logs

DATA ENTRY: IPG

PROJECT No.: 11.1422.0052

RECORD OF MONITORING WELL: GA-MW-01

SHEET 1 OF 3

LOCATION: See Location Plan
N: 5554750 E: 648019

BORING DATE: September 21, 2012

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Barber Rig – Air Rotary Tervita	Ground Surface		1357.00							Stick-up = 1.05 m
		(SP) SAND, coarse-grained, sub-angular, poorly-graded, dark grey		0.00							
1											
2					1	GRAB					
3											
4				1353.00							
		(GP) CLAYEY GRAVEL, coarse-grained, poorly-graded, sub-rounded clay, brown, firm		4.00							
5											Bentonite Pellets
6											
7					2	GRAB					
8											
9				1348.00							
		(SP) SAND, coarse-grained, poorly-graded, trace gravel, sub-angular, trace clay, dark grey		9.00							
10					3	GRAB					
		CONTINUED NEXT PAGE									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: TG
CHECKED: JW

BOREHOLE - EXPANDED ADD. LAB TESTING 11.1422.0052_BH LOGS.GPJ CALGARY.GDT 7/30/15

DATA ENTRY: IPG

PROJECT No.: 11.1422.0052

RECORD OF MONITORING WELL: GA-MW-01

SHEET 2 OF 3

LOCATION: See Location Plan
N: 5554750 E: 648019

BORING DATE: September 21, 2012

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Barber Rig – Air Rotary Tervita	(SP) SAND, coarse-grained, poorly-graded, trace gravel, sub-angular, trace clay, dark grey *(continued)*									Bentonite Pellets
11											
12					4	GRAB					
13											
14											
15		(SC) CLAYEY SAND, medium-grained, poorly-graded, dark grey		1342.00 15.00							10/20 Sand
16											Slotted Section 10/20 Sand
17					5	GRAB					23 Sep 2012 ▽
18											
19		(SP) SAND, coarse-grained, sub-angular, poorly-graded, dark grey		1338.00 19.00	6	GRAB					Bentonite Pellets
20		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: TG
CHECKED: JW

BOREHOLE - EXPANDED ADD. LAB TESTING 11.1422.0052_BH LOGS.GPJ CALGARY.GDT 7/30/15

DATA ENTRY: IPG

PROJECT No.: 11.1422.0052

RECORD OF MONITORING WELL: GA-MW-01

SHEET 3 OF 3

LOCATION: See Location Plan

N: 5554750 E: 648019

BORING DATE: September 21, 2012

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q- ●, U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Barber Rig – Air Rotary Tervita	(SP) SAND, coarse-grained, sub-angular, poorly-graded, dark grey *(continued)*									
21					6	GRAB					Bentonite Pellets
22		— Bedrock at 22.6 m		1334.40	7	GRAB					
		End of MONITORING WELL.		22.60							
23		NOTES: Hit BEDROCK at 22.6 m. Standpipe installed to 18.6 m. Groundwater level measured at at 17.5 mGL on September 23, 2012.									
24											
25											
26											
27											
28											
29											
30											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: TG

CHECKED: JW

BOREHOLE - EXPANDED ADD. LAB TESTING 11.1422.0052_BH LOGS.GPJ CALGARY.GDT 7/30/15

DATA ENTRY: VI

PROJECT No.: 11.1348.0020.2000

RECORD OF BOREHOLE: GA-HMW5

SHEET 1 OF 1

LOCATION: See Location Plan

BORING DATE: August 09, 2011

DATUM: Geodetic

N: 655476 E: 5567514

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		1785.20							
0	Barber Rig H24 Air Rotary, BECK Drilling & Environmental Services Ltd.	Very loose, non-plastic, dry, grey to brown, loose grained to cobble size GRAVEL, non-cohesive with some medium grained, angular to subangular, (with little matrix) (ALLUVIUM)		0.00							
1					1	GRAB					13 Aug 2011 ▽
2											
3											
4		--- Soft, low plasticity, damp, non-cohesive, with more grey CLAY									
5					2	GRAB					
6											
				1778.50							
7		Hard layer, angular fragments, low returns GRAVEL		6.90							
		Very loose, low plasticity, damp, grey to brown, loose grained to cobble size GRAVEL, non-cohesive with some medium grained, angular to subangular (with little matrix) (ALLUVIUM)									
8					3	GRAB					
9											
		--- Clay becomes dark brown, damp, cohesive and very dense									
10					4	GRAB					
				1774.50							
11		Very loose fragments (drill cut-up), wet, massive, light to dark grey, angular BEDROCK		10.70							
12					5	GRAB					
				1772.40							
13		End of BOREHOLE.		12.80							
14											
15											

BOREHOLE - EXPANDED ADD. LAB TESTING 11.1348.0020 2000 BH LOGS.GPJ CALGARY.GDT 12/15/11

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: TC

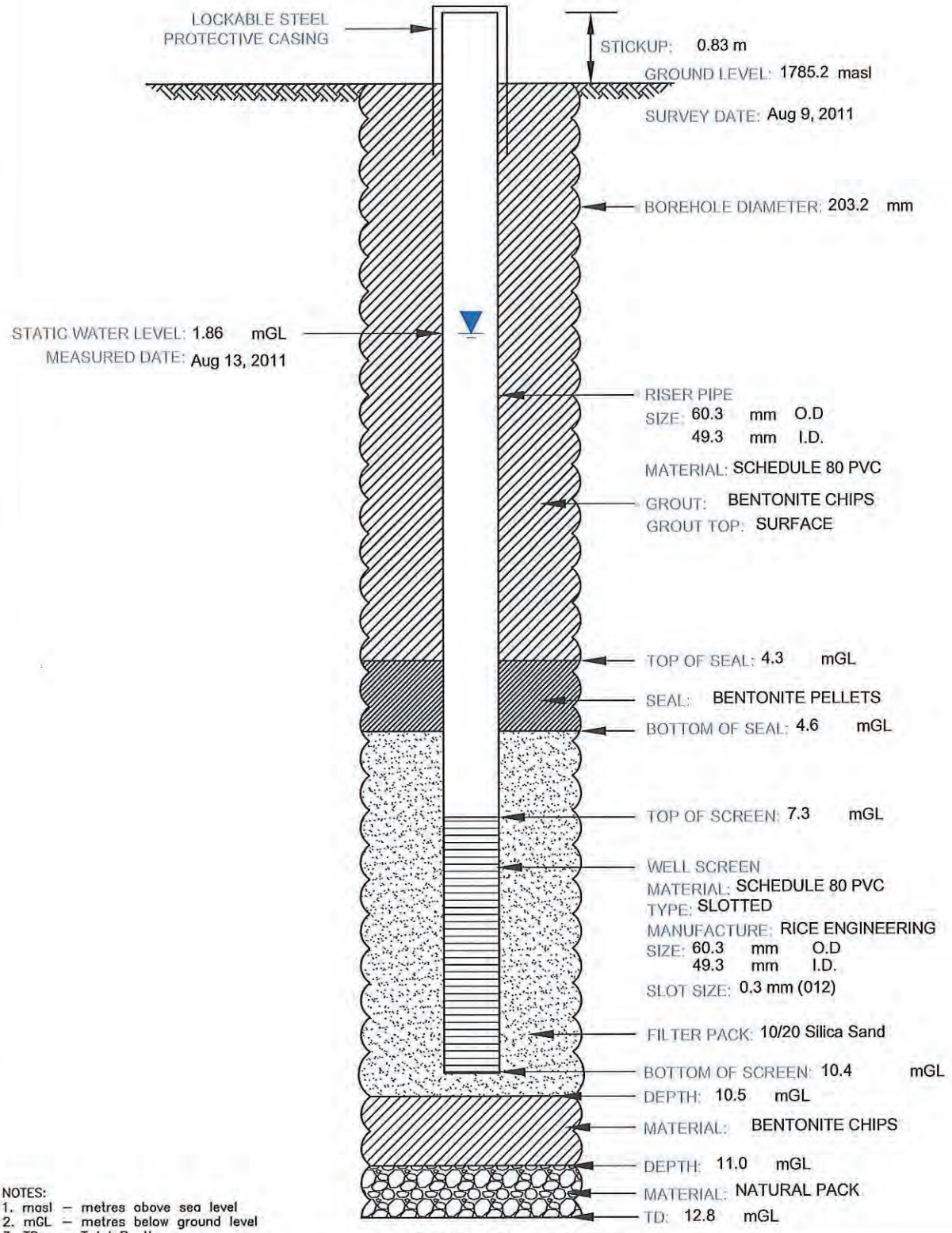
CHECKED: JW

MONITORING WELL CONSTRUCTION DETAILS

Short Well ID	Well Owner: Teck Coal Fording River Operations	Spud Date: Aug 9, 2011
H5		Project Short Title: Teck Coal FRO - Henretta
	Well Name: GA-HMW5	Project Number: 11.1348.0020-1000-2000
		Site Geologist: T.Crowell

Drilling Method:	Development:	
Air Rotary	Method: Air Lift	Duration: 1.75 Hours

SCHEMATIC ONLY–NOT TO SCALE



NOTES:
1. masl – metres above sea level
2. mGL – metres below ground level
3. TD – Total Depth

Golder Associates

File Path: R:\Active_2011\1348\11-1348-0020 Teck Coal Henretta Ridge Assessment\Phase 2000 Drilling Report\Final

srk consulting

Teck

HOLE ID:	MW-3	COORDINATES:	668230 E 5482814 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1573.4
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1545.97
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	27.43
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.81
BORING DATE:	8/11/2015 to 8/12/2015	CASING STICKUP (magl):	0.81

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
0	Clay and gravel (CL-CH); Some sand. Very dark grayish brown, gap graded, wet, sub-rounded, medium-plasticity, cohesive.	
2	Gravel and sand (GM); Some silt. Dark brown, well graded, moist, sub-rounded, non-plastic, non-cohesive.	Drilling slow, going through clay with cobbles/gravel, clay quite firm
4	Clay and gravel (CH); Some sand. Very dark grayish brown, gap graded, moist, sub-rounded, high-plasticity, cohesive.	Fines cohesive, but not whole sample
6	Gravel and silt (GM); Very dark grayish brown, gap graded, dry, sub-rounded, non-plastic, non-cohesive.	Hit bedrock, very dry and dusty
8	Siltstone bedrock; Black, dry.	
10		
12		

19-Aug-15

19-Aug-15

19-Aug-15

srk consulting

Teck

HOLE ID:	**MW-3**	COORDINATES:	668230 E 5482814 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1573.4
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1545.97
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	27.43
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.81
BORING DATE:	8/11/2015 to 8/12/2015	CASING STICKUP (magl):	0.81

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

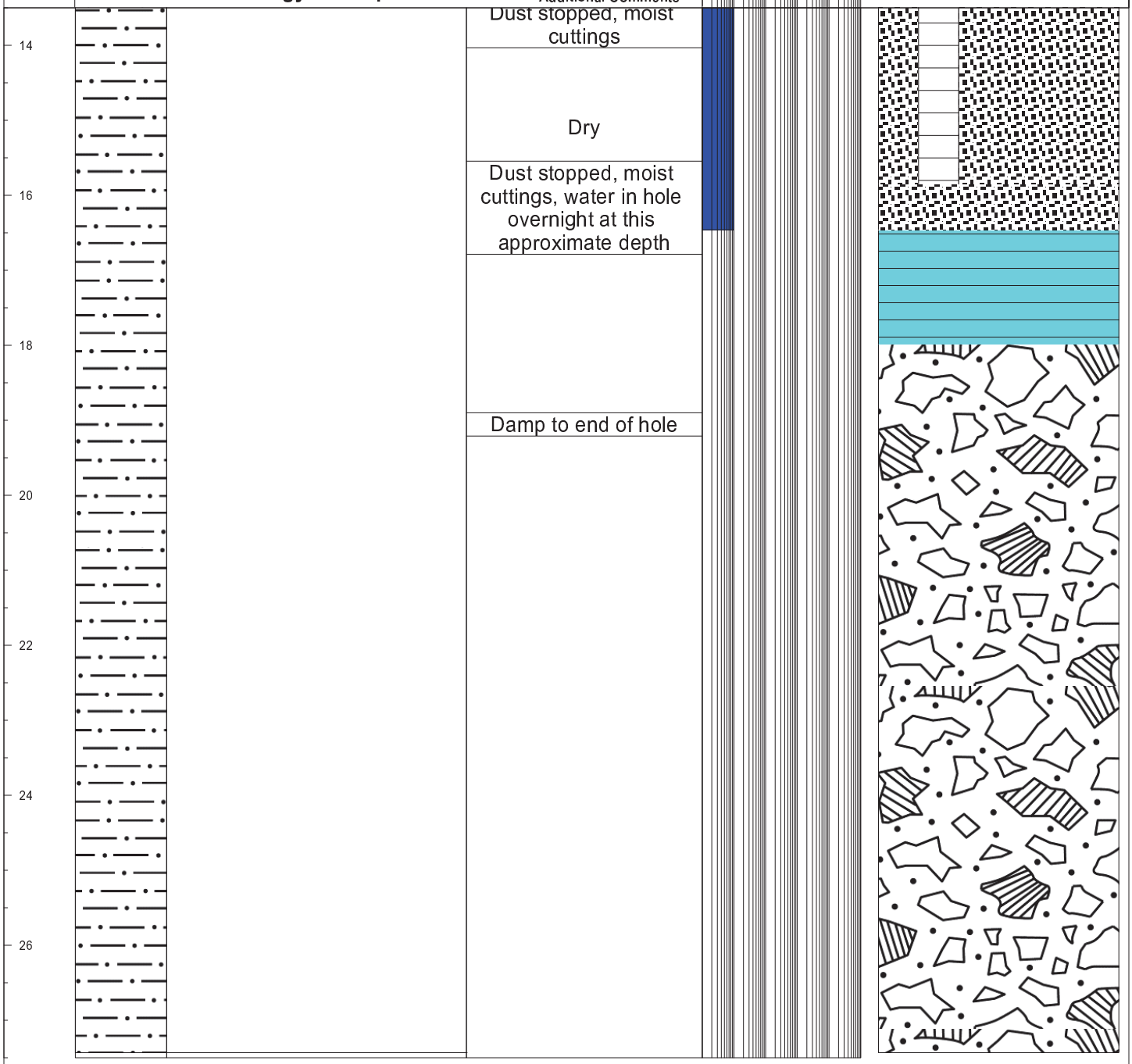
AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
14		Dust stopped, moist cuttings
		Dry
16		Dust stopped, moist cuttings, water in hole overnight at this approximate depth
18		
		Damp to end of hole
20		
22		
24		
26		



DATA ENTRY: KJM

PROJECT No.: 09-1324-1039

RECORD OF MONITORING WELL: 09-01A

SHEET 1 OF 1

LOCATION: East of Old Stream Bed Kilmamock Alluvium

BORING DATE: October 14, 2009

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m
0	Barber Rig - DR-24 - 9" Hole Diameter, Beck Drilling and Environmental Services Ltd.	Ground Surface		1584.1			
		Silty SAND, trace gravel, loose, dry, light brown		0.0 1583.6			
		Sandy GRAVEL, trace silt, loose, moist, medium brown		0.5 1582.1			
2		Clayey SILT, some sand and gravel, soft, low to medium plasticity, moist, medium brown		2.0 1581.6			
		Sandy GRAVEL, loose, moist, medium brown		2.5			
4							
6							
8				1575.7			
		End of MONITORING WELL.		8.4			
10							
12							
14							
16							
18							
20							

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20, 40, 60, 80

SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ○: 10, 20, 30, 40

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-6}, 10^{-5}, 10^{-4}, 10^{-3}

WATER CONTENT PERCENT: Wp — W — Wl: 10, 20, 30, 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

Stickup =0.85 m

Bentonite

Granular Filter

Slotted Section

Oct. 16, 2009

Slough

DEPTH SCALE

1 : 100

Golder Associates

LOGGED: EA

CHECKED: MB

BOREHOLE 09-1324-1039_LOGS.GPJ CALGARY.GDT 1/11/16

DATA ENTRY: KJM

PROJECT No.: 09-1324-1039

RECORD OF MONITORING WELL: 09-01B

SHEET 1 OF 2

LOCATION: East of Old Stream Bed Kilmarnock Alluvium

BORING DATE: October 14, 2009

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		1584.1							Stickup =0.76 m
0		Silty SAND, trace gravel, loose, dry, light brown		0.0 / 1583.6							
		Sandy GRAVEL, trace silt, loose, moist, medium brown		0.5 / 1582.1							
2		Clayey SILT, some sand and gravel, soft, low to medium plasticity, moist, medium brown		2.0 / 1581.6							
		Sandy GRAVEL, loose, moist, medium brown		2.5							Bentonite
4											
6											
											Oct 16, 2009 ▽
8											
				1574.1							
10		Coarse GRAVEL, trace sand, loose, saturated, grey to medium brown		10.0							Slough
12		— Some silty sand from 12.5 to 13.0 m									
14											
16											Bentonite
											Slotted Section
18		— Medium to coarse gravel, light grey to brown from 18.0 to 23.0 m									Slough
20											
		CONTINUED NEXT PAGE									

Barber Rig - DR-24 - 5" Hole Diameter
Beck Drilling and Environmental Services Ltd.

DEPTH SCALE
1 : 100

Golder Associates

LOGGED: EA
CHECKED: MB

BOREHOLE 09-1324-1039_LOGS.GPJ CALGARY.GDT 1/11/16

DATA ENTRY: KJM

PROJECT No.: 09-1324-1039

RECORD OF MONITORING WELL: 09-01B

SHEET 2 OF 2

LOCATION: East of Old Stream Bed Kilmamock Alluvium

BORING DATE: October 14, 2009

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Barber Rig - DR-24 - 9" Hole Diameter Beck Drilling and Environmental Services Ltd.	Coarse GRAVEL, trace sand, loose, saturated, grey to medium brown *(continued)*									Slough
22											
24											
26											
28		— Silty sand, saturated, medium brown from 28.5 to 29.0 m		1555.1							
		End of MONITORING WELL.		29.0							
30											
32											
34											
36											
38											
40											

DEPTH SCALE
1 : 100

Golder Associates

LOGGED: EA
CHECKED: MB

BOREHOLE 09-1324-1039_LOGS.GPJ CALGARY.GDT 1/11/16

BRITISH COLUMBIA

TABLE A-1 - Detailed Well Record For Well #3

Well Tag Number: 819
Driller: R. J. Drilling
Owner: FORDING COAL LTD PUR
WELL LOCATION:
KOOTENAY Land District
District Lot: 6687 Plan: Lot:
BCGS Number (NAD 27): 082J006421 Well: 2 WATER QUALITY:
Diameter: 6.0 inches
Well Depth: 40 feet

GENERAL REMARKS:
YIELD: 80 GPM COMMERCIAL & INDUSTRIAL

LITHOLOGY INFORMATION:

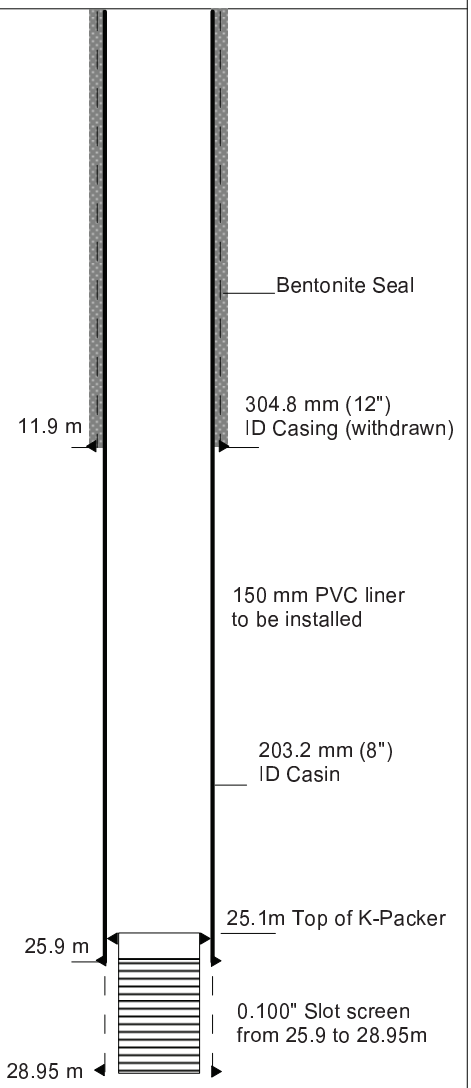
From 0 to 15 Ft. TILL
From 15 to 40 Ft. GRAVEL

H:\Project\3149\Well_Log\[Web_log.xls]819(well#3)

H:\Project\3149\Well_Log\Drilled_Well4_Greenhouse.grf

ELEV. (m-GEOD)	DEPTH (m-BGL)	GEOLOGICAL DESCRIPTION	AIR LIFT YIELD (L/s)
1570	0		0 10
1560	2	Brown Organic Sand and Silt and Clay. Moist	
1550	4	3.0 m-bgl	
1540	6	Brown Sand with plastic Clay and silt. Moist to wet.	
1530	8		
1520	10		
1510	12	12.2 m-bgl	
1500	14	Brown fine to medium grain Sand. Water bearing	
1490		15.2 m-bgl	
1480	16		
1470	18	Brown Medium to Coarse grain Sand. Water bearing	
1460		18.3 m-bgl	
1450	20	Brown Medium to Coarse grain Sand. Moist but no flow	
1440	22	21.3 m-bgl	
1430	24	Brown Sand with some Gravel Water bearing - good yield	
1420	26	24.4 m-bgl	
1410		Brown Sand. Water bearing - good yield	
1400	28	27.4 m-bgl	
1390	30	Brown Sand with some Gravel. Water bearing - good yield	
1380	32	End of Hole at 28.95 m-bgl	
1370	34		

WELL / PIEZOMETER CONSTRUCTION
EASTING: 24790.54 NORTHING: 144633.5
GROUND ELEVATION: 1575.8 m



LEGEND

- Overburden
- Clay
- Sand

DRILLING CONTRACTOR:	J.R. Drilling Ltd.
DRILLING METHOD:	DUAL ROTARY / AIR HAMMER
START DATE:	08-Nov-12
END DATE:	09-Nov-12
HYDROGEOLOGY:	Eric Pastora

KERR WOOD LEIDAL ASSOCIATES LTD.
HYDROGEOLOGICAL ASSESSMENT
FORDING RIVER GREENHOUSE, ELKFORD, BC

PITEAU ASSOCIATES
GEOTECHNICAL AND HYDROGEOLOGICAL CONSULTANTS

HYDROGEOLOGICAL LOG FOR WELL No 4

BY	DATE
EP	DEC 12
APPROVED	FIG.
ATH	1

Log of Monitoring Well: GH_MW-PC

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 2nd, 2016

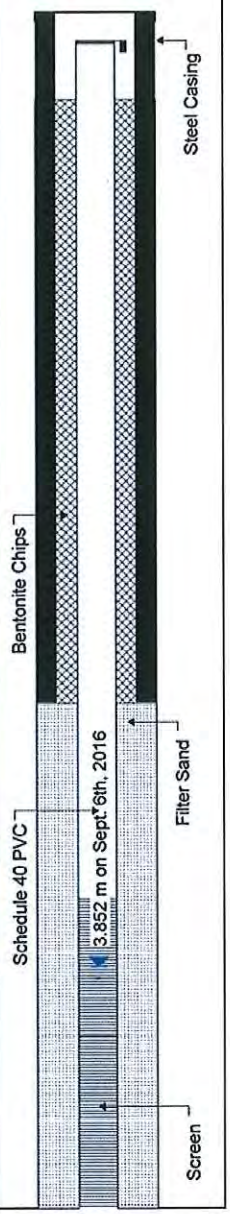
Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	Backfill details
		Ground Surface	0.00						
0		**TOPSOIL** TOPSOIL, brown, fine to medium silty sand with fine sub-angular gravel and rootlets	0.00						
3 / 1		**COBBLES and GRAVEL** COBBLES and GRAVEL, with silt and sand, pulverized from drilling.	-1.00 1.00						
13 / 4		Groundwater encountered at approximately 4.5 mbgs							



Well location: Porter Creek

Depth to water level (TOC): 3.852

Date of water level: September 6th, 2016

Borehole diameter: 15.24

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 3.5-6.5

Depth of well (TOC): 7.601

Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-PC

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 2nd, 2016

Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

SUBSURFACE PROFILE			SAMPLE						Backfill details
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	
17									
18			-5.50						
19		**BEDROCK** BEDROCK (likely limestone), pulverized silt to fine/medium sub-angular/sub-rounded gravel size particles, crystalline, very hard, dry	5.50						
20	6								
21									
22									
23	7								
24									
25									
26	8								
27									
28									
29	9								
30									
31									
32									
33	10								
34									
35									
36	11								

Well location: Porter Creek

Depth to water level (TOC): 3.852

Date of water level: September 6th, 2016

Borehole diameter: 15.24

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 3.5-6.5

Depth of well (TOC): 7.601

Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-PC

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 2nd, 2016

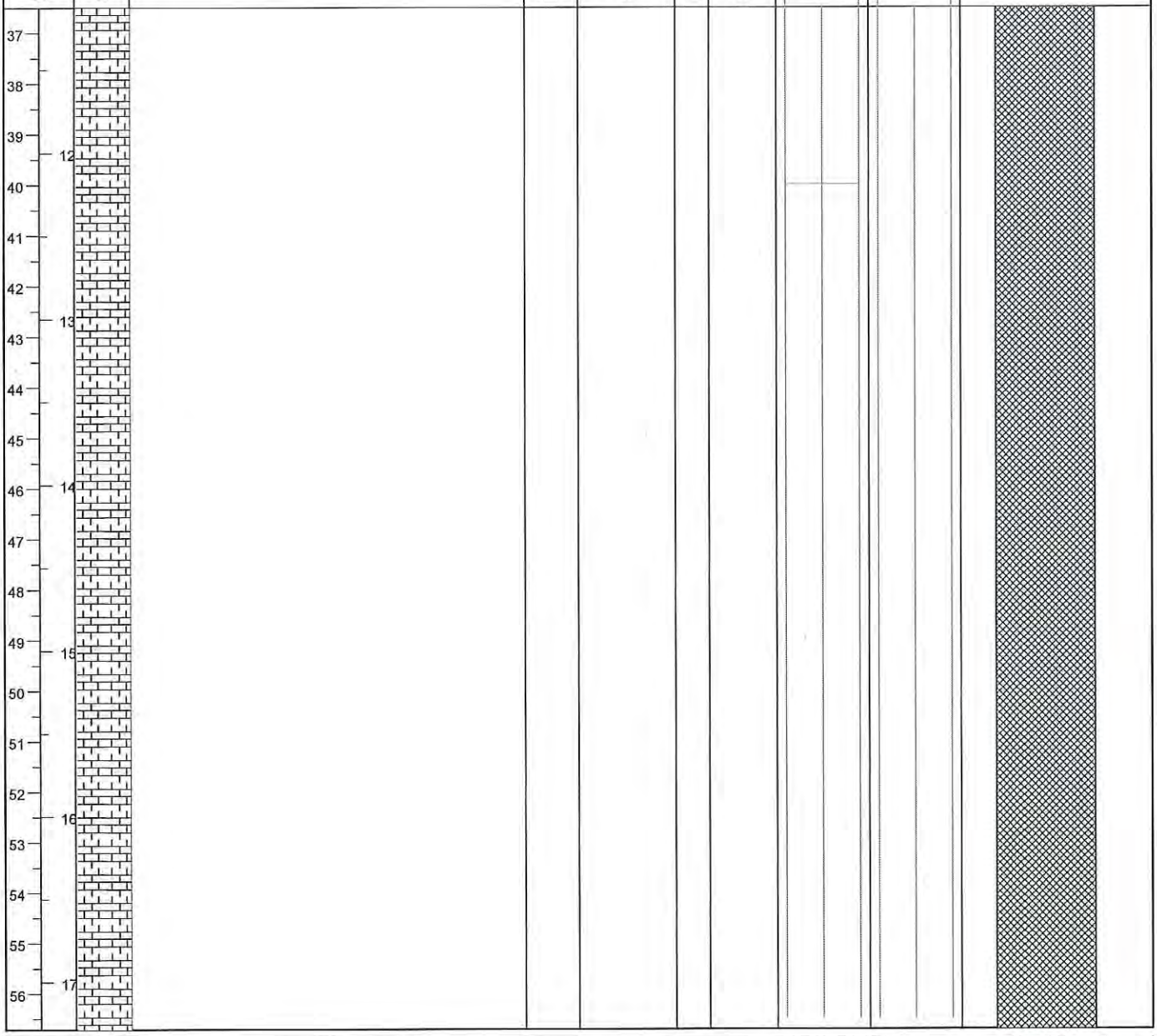
Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

SUBSURFACE PROFILE			SAMPLE						Backfill details
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	



Well location: Porter Creek

Depth to water level (TOC): 3.852

Date of water level: September 6th, 2016

Borehole diameter: 15.24

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 3.5-6.5

Depth of well (TOC): 7.601

Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-PC

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 2nd, 2016

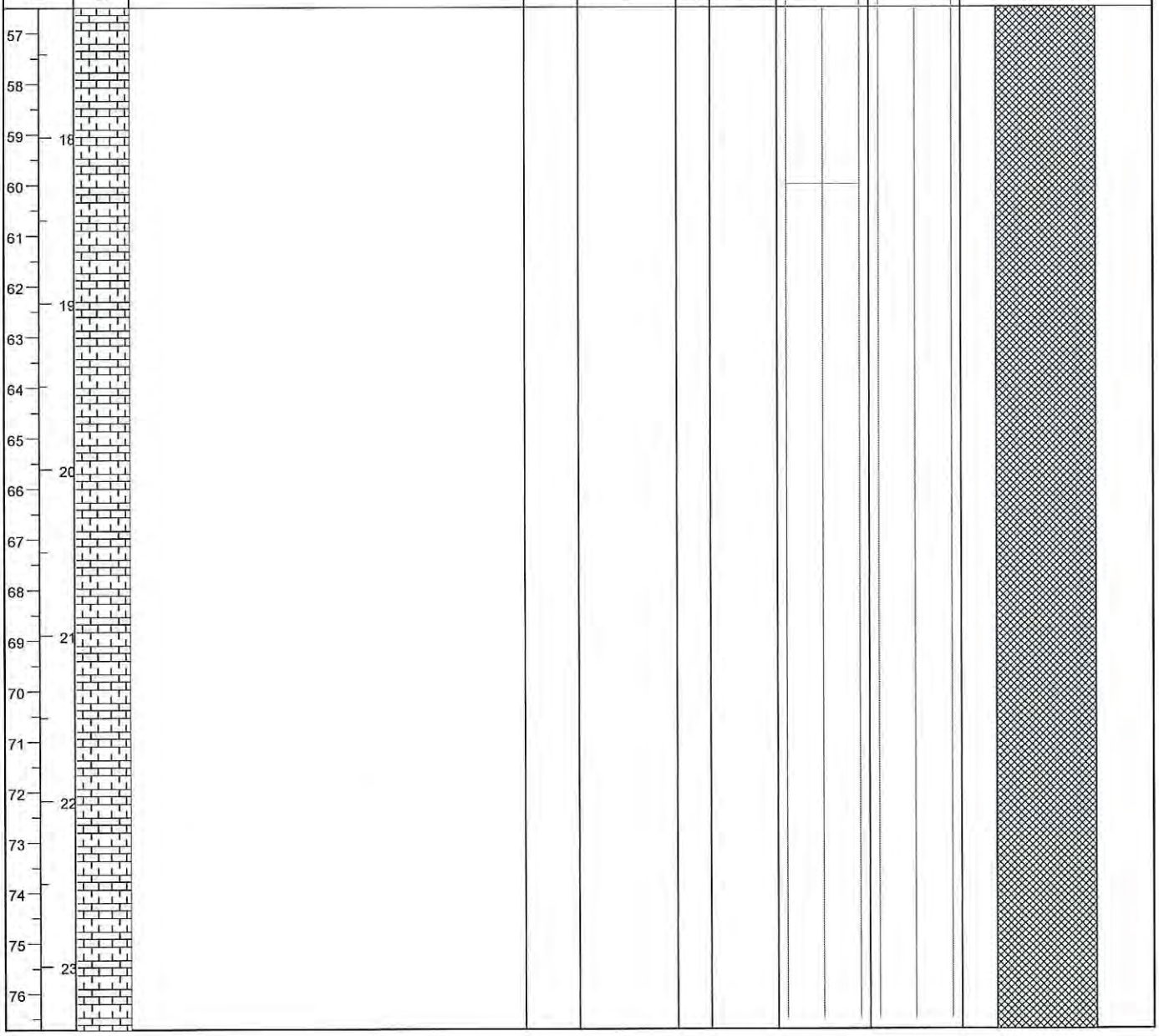
Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

SUBSURFACE PROFILE			SAMPLE						Backfill details
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	



Well location: Porter Creek

Depth to water level (TOC): 3.852

Date of water level: September 6th, 2016

Borehole diameter: 15.24

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 3.5-6.5

Depth of well (TOC): 7.601

Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-PC

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 2nd, 2016

Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

Sheet: 5 of 8

SUBSURFACE PROFILE			SAMPLE						Backfill details
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	
77									
78									
24		Small fracture encountered at 24 mbgs but was not found to have enough water to conduct a flow test							
79									
80									
81									
82									
25									
83									
84									
85									
26									
86									
87									
88									
27									
89									
90		From 27.5 mbgs drilling was noted to be smoother/easier; no observable change was identified in rock chips							
91									
92									
28									
93									
94									
95									
29									
96									

Well location: Porter Creek

Depth to water level (TOC): 3.852

Date of water level: September 6th, 2016

Borehole diameter: 15.24

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 3.5-6.5

Depth of well (TOC): 7.601

Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-PC

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 2nd, 2016

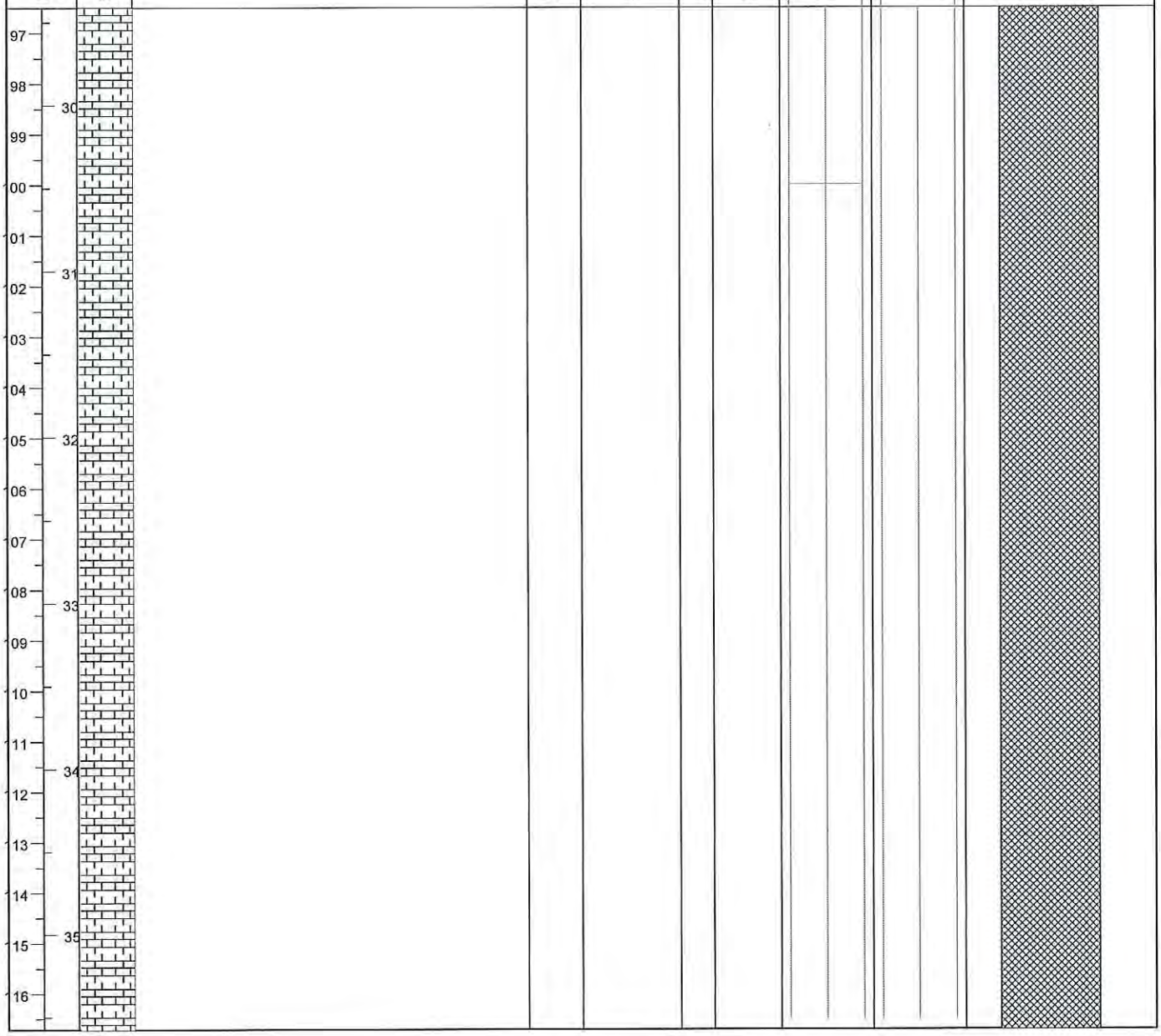
Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

SUBSURFACE PROFILE			SAMPLE						
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	Backfill details



Well location: Porter Creek

Depth to water level (TOC): 3.852

Date of water level: September 6th, 2016

Borehole diameter: 15.24

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 3.5-6.5

Depth of well (TOC): 7.601

Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-PC

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 2nd, 2016

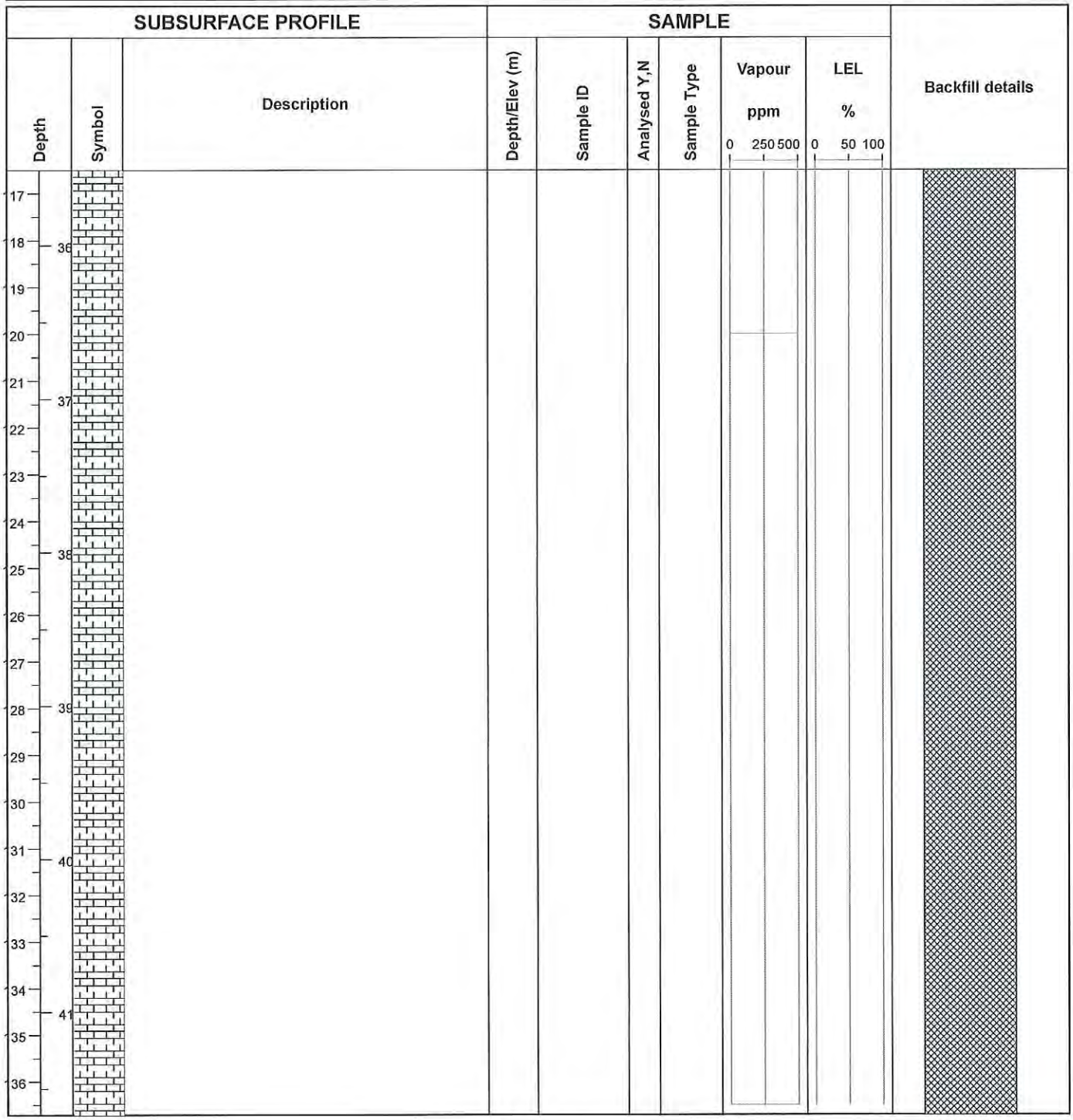
Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

Sheet: 7 of 8



Well location: Porter Creek

Depth to water level (TOC): 3.852

Date of water level: September 6th, 2016

Borehole diameter: 15.24

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 3.5-6.5

Depth of well (TOC): 7.601

Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-PC

HEMMERA

Project Name/No: 577-016.07
Client: Teck Coal Greenhills Operation
Date Drilled: September 2nd, 2016
Site Location: Elkford, BC

Drilling Company: JR Drilling
Drilling Method: Dual Rotary
Logged by: TK

Sheet: 8 of 8

Well location: Porter Creek
Depth to water level (TOC): 3.852
Date of water level: September 6th, 2016
Borehole diameter: 15.24

Well casing diameter: 50.8mm
Well casing material: Schedule 40 PVC
Well screen slot size: 0.25mm
Well screen interval (bgs): 3.5-6.5

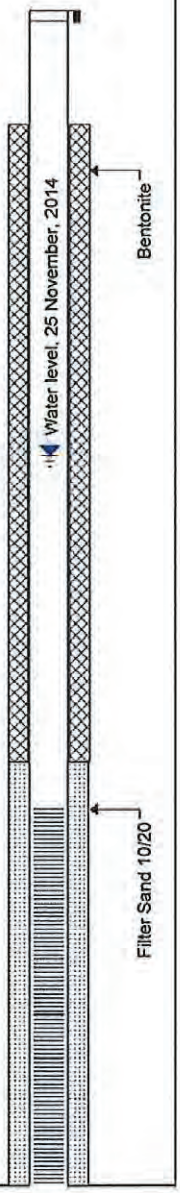
Depth of well (TOC): 7.601
Well Elevation (TOC): -
Ground Elevation: -

Log of Monitoring Well: GH_MW-GHC-1S

HEMMERA

Project Name/No: Greenhills Ops Elkford BC/577-016.04
Drilling Company: JR Drilling
Client: Teck Coal Ltd.
Drilling Method: Dual air rotary
Date Drilled: November 18, 2014
Logged by: RM
Site Location: Greenhills Operations, BC
Sheet: 1 of 2

SUBSURFACE PROFILE			SAMPLE						Backfill details
Depth (ft / m)	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	
0 ft / 0 m		Ground Surface	1610.00 / 0.00						
		TOPSOIL Black, dry, loose, organic soil							
		TILL Sandy (fine, medium and coarse grain) TILL, some gravel (fine and medium grain, sub-angular), brown, dry, loose, well graded							
4 ft / 1 m		Silty TILL, dark brown, wet, dense	1608.78 / 1.22						
7 ft / 2 m		Water table at 2.13 m	1607.87 / 2.13						
12 ft / 3.66 m		Gravelly (fine to medium grain, sub-angular) TILL, dark brown, wet, loose to medium dense, well graded. Silty lenses present throughout. Between 4.57 m and 7.62 m, moderate water yield.	1606.34 / 3.66						
23 ft / 7 m									



Well location: 5,547,205 N, 654,050 E
Well casing diameter: 2"
Depth of well (TOC): 7.63 m
Depth to water level (TOC): 2.976 m
Well casing material: Sch. 80 PVC
Well Elevation (TOC): 1610.8 m
Date of water level: 25 Novermber, 2014
Well screen slot size: 010
Ground Elevation: 1610 m
Borehole diameter: 0.17 m
Well screen interval (bgs): 4.58 m - 7.63 m

DATA ENTRY: IPG

PROJECT No.: 11.1422.0052

RECORD OF MONITORING WELL: GA-MW-02

SHEET 1 OF 3

LOCATION: See Location Plan

BORING DATE: September 19, 2012

DATUM: UTM Zone 11 (Nad 83)

N: 5552115 E: 648291

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		1310.00							Stick-up = 1.02 m
0	Barber Rig – Air Rotary, Tervita	(SP) SAND, coarse-grained, trace fine gravel, angular, poorly-graded, grey		0.00							
1											
2					1	GRAB					
3											
4											19 Sep 2012 ▽
5		(GP) GRAVEL, coarse-grained, sub-rounded, brown		1305.00 5.00							Bentonite Pellets
6					2	GRAB					
7		(CI) SILTY CLAY, some fine gravel, brown, cohesive, water content is close to plastic limit, very soft		1303.00 7.00							
8					3	GRAB					
9											
10				1300.00							
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: TG

CHECKED: JW

BOREHOLE - EXPANDED ADD. LAB TESTING 11.1422.0052_BH LOGS.GPJ CALGARY.GDT 7/30/15

DATA ENTRY: IPG

PROJECT No.: 11.1422.0052

RECORD OF MONITORING WELL: GA-MW-02

SHEET 2 OF 3

LOCATION: See Location Plan

N: 5552115 E: 648291

BORING DATE: September 19, 2012

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Barber Rig – Air Rotary Tervita	(GW) GRAVEL, coarse-grained, sub-angular, well graded, grey		10.00	4	GRAB					
11				1298.50							
		(CI) SILTY CLAY, with some fine gravel, brown, cohesive, very soft, w~PL		11.50							
12											
13											
14					5	GRAB					
15											Bentonite Pellets
16											
17				1292.80							
		(SP) SAND, coarse-grained, some fine gravel, angular, poorly-graded, dark grey		17.20							
18					6	GRAB					
19				1290.50							
		(GW) GRAVEL, coarse-grained, sub-angular, well graded, grey		19.50	7	GRAB					
20		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING 11.1422.0052 BH LOGS.GPJ CALGARY.GDT 7/30/15

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: TG

CHECKED: JW

DATA ENTRY: IPG

PROJECT No.: 11.1422.0052

RECORD OF MONITORING WELL: GA-MW-02

SHEET 3 OF 3

LOCATION: See Location Plan

N: 5552115 E: 648291

BORING DATE: September 19, 2012

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; 20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Barber Rig – Air Rotary Tervita	(GW) GRAVEL, coarse-grained, sub-angular, well graded, grey *(continued)*											Bentonite Pellets
21					7	GRAB							
22													10/20 Sand
23				1287.00									
		(ML) SILT, some fine gravel, trace coarse gravel, dark grey, non-cohesive, dry		23.00	8	GRAB							
24				1286.00									
		(SP) SAND, coarse-grained, some fine gravel, angular, poorly-graded, dark grey		24.00									
25													
26													Slotted Section 10/20 Sand
27					9	GRAB							
28		— Bedrock at 28.5 m											
29		NOTES: Encountered BEDROCK at 28.5 m. Standpipe installed to 29.0 m. Groundwater level measured at 11.0 mGL on September 19, 2012.											Bentonite Pellets
				1280.50	10	GRAB							
		(SP) SAND, coarse-grained, coarse gravel, bits of bedrock, sub-angular, poorly-graded, light grey		29.60									
30		End of MONITORING WELL.											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: TG

CHECKED: JW

BOREHOLE - EXPANDED ADD. LAB TESTING 11.1422.0052 BH LOGS.GPJ CALGARY.GDT 7/30/15

DATA ENTRY: IPG

PROJECT No.: 11.1422.0052

RECORD OF MONITORING WELL: GA-MW-04

SHEET 1 OF 2

LOCATION: See Location Plan

N: 5552963 E: 648217

BORING DATE: September 20, 2012

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		1304.00							Stick-up = 0.9 m
0	Barber Rig – Air Rotary Tervita	(SP) GRAVELLY SAND, coarse-grained, fine gravel, sub-angular, poorly-graded, dark grey		0.00							
1											
2											
3											
4					1	GRAB					
5											Bentonite Pellets
6											24 Sep 2012 ▽
7											
8											
9				1295.00							
		(SM) SILTY SAND, medium to fine-grained, sub-rounded, poorly-graded, brown and dark grey		9.00	2	GRAB					
10				1294.00							
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: TG

CHECKED: JW

BOREHOLE - EXPANDED ADD. LAB TESTING 11.1422.0052_BH LOGS.GPJ CALGARY.GDT 7/30/15

DATA ENTRY: IPG

PROJECT No.: 11.1422.0052

RECORD OF MONITORING WELL: GA-MW-04

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: September 20, 2012

DATUM: UTM Zone 11 (Nad 83)

N: 5552963 E: 648217

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Barber Rig – Air Rotary Tervita	(SP) GRAVELLY SAND, coarse-grained, fine gravel, sub-angular, poorly-graded, dark grey		10.00							Bentonite Pellets
11											
12					3	GRAB					
13											10/20 Sand
14				1290.00							
		(SM) SILTY SAND, medium to fine-grained, sub-rounded, poorly-graded, brown and dark grey		14.00	4	GRAB					
				1289.50							
		(GW) GRAVEL, fine with coarse, sub-angular to sub-rounded, well graded, grey		14.50							
15											Slotted Section 10/20 Sand
16					5	GRAB					
17				1287.00							Bentonite Pellets
		(SP) GRAVELLY SAND, coarse-grained, fine gravel, poorly-graded, sub-angular, dark grey			6	GRAB					
				17.20							
		End of MONITORING WELL.									
18		NOTES: Standpipe installed to 16.7 m. Groundwater present at 6.0 m on September 24, 2012.									
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING 11.1422.0052_BH LOGS.GPJ CALGARY.GDT 7/30/15

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: TG

CHECKED: JW

DATA ENTRY: IPG

PROJECT No.: 11.1422.0052

RECORD OF MONITORING WELL: GA-MW-3S

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: September 23, 2012

DATUM: UTM Zone 11 (Nad 83)

N: 5550296 E: 648578

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (20 40 60 80); nat V. + Q - ●; rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}); WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		1294.00							
		(SP) SAND, coarse-grained, sub-angular, poorly-graded, dark grey, homogenous, moist		0.00							
1											
2					1	GRAB					
3											Bentonite Pellets
4											
	Barber Rig – Air Rotary Tervita			1289.50							
5		(SP) GRAVELY SAND, coarse-grained, fine gravel, poorly-graded, sub-angular, grey		4.50							
6											
7					2	GRAB					10/20 Sand
											23 Sep 2012 ▽
8											
9											Slotted Section 10/20 Sand
10		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: TG

CHECKED: JW

BOREHOLE - EXPANDED ADD. LAB TESTING 11.1422.0052_BH LOGS.GPJ CALGARY.GDT 7/30/15

DATA ENTRY: IPG

PROJECT No.: 11.1422.0052

RECORD OF MONITORING WELL: GA-MW-3S

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: September 23, 2012

DATUM: UTM Zone 11 (Nad 83)

N: 5550296 E: 648578

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Barber Rig – Air Rotary Tervita	(SP) GRAVELY SAND, coarse-grained, fine gravel, poorly-graded, sub-angular, grey *(continued)*									
11					3	GRAB					
12											Slotted Section 10/20 Sand
13					4	GRAB					
14				1279.60							Bentonite Pellets
		End of MONITORING WELL.		14.40							
15		NOTES: Encountered BEDROCK at 14.4 m									
16											
17											
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING 11.1422.0052_BH LOGS.GPJ CALGARY.GDT 7/30/15

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: TG

CHECKED: JW

Log of Monitoring Well: GH_MW-ERSC-1

HEMMERA

Project Name/No: Greenhills Ops Elkford BC/577-016.04

Client: Teck Coal Ltd.

Date Drilled: November 24, 2014

Site Location: Greenhills Operations, BC

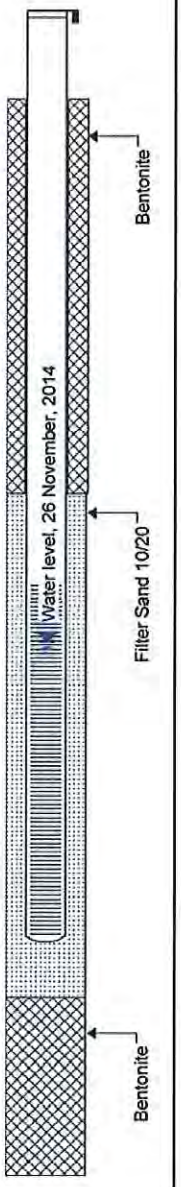
Drilling Company: JR Drilling

Drilling Method: Dual air rotary

Logged by: RM

Sheet: 1 of 1

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	Backfill details
		Ground Surface	1293.00						
		TOPSOIL Black, dry, loose, organic soil	0.00						
		TILL Gravelly Till (rounded to subrounded, medium to coarse grain), brown, dry, dense, well graded, lots of rock cuttings.							
			1288.73						
		Sandy Till (medium grain) and Gravel (rounded to subrounded, medium to coarse grain), brown, moist, dense, well graded, lots of rock cuttings.	4.27						
			1287.82						
		Below 5.2 m, a water bearing seam <0.31 m width.	5.18						
			1287.51						
		Sandy Till (medium grain) and Gravel (rounded to subrounded, medium to coarse grain), brown, moist, dense, well graded, lots of rock cuttings.	5.49						
			1286.90						
		BEDROCK Siltstone, grey, dry, competent, very hard	6.10						
			1286.29						
		Between 6.7 m and 7.0 m, fracture zone, moist	6.71						
			1285.99						
		Below 7.2 m material is dry, very hard, uniform size cuttings, dusty drilling conditions	7.01						
			1283.86						
		End of Log	9.14						



Well location: 5,548,704 N, 649,081 E

Depth to water level (TOC): 5.349 m

Date of water level: 26 November, 2014

Borehole diameter: 0.17 m

Well casing diameter: 2"

Well casing material: Sch. 80 PVC

Well screen slot size: 010

Well screen interval (bgs): 4.12 m - 7.17 m

Depth of well (TOC): 7.924 m

Well Elevation (TOC): 1293.75 m

Ground Elevation: 1293 m

BRITISH COLUMBIA

Greenhills Well 9

Report 1 - Detailed Well Record

GH_POTW09

Well Tag Number: 85223

Owner: ELK VALLEY COAL - GREENHILLS OPERATION

Address:

Area: GREENHILLS

WELL LOCATION:
Land District
District Lot: 4588 Plan: 11279 Lot: 1
Township: Section: Range:
Indian Reserve: Meridian: Block:
Quarter:
Island:
BCGS Number (NAD 83): Well: 5

Class of Well:
Subclass of Well:
Orientation of Well:
Status of Well:
Well Use:
Observation Well Number:
Observation Well Status:
Construction Method:
Diameter: 10.75 inches
Casing drive shoe:
Well Depth: 117 feet
Elevation: feet (ASL)
Final Casing Stick Up: inches
Well Cap Type:
Bedrock Depth: 117 feet
Lithology Info Flag: Y
File Info Flag: N
Sieve Info Flag: N
Screen Info Flag: Y

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date: 1992-06-29 00:00:00

Driller:
Well Identification Plate Number: 15802
Plate Attached By: KIMBERLY RASMUSSEN
Where Plate Attached: WELL CASING

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: (Driller's Estimate)
Development Method:
Pump Test Info Flag: N
Artesian Flow: UNKNOWN YIELD
Artesian Pressure (ft):
Static Level:

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag: N
Field Chemistry Info Flag:
Site Info (SEAM): N

Water Utility: N
Water Supply System Name: GREENHILLS WATER SUPPLY SYSTEM
Water Supply System Well Name: WELL 9

SURFACE SEAL:
Flag: Y
Material:
Method:
Depth (ft): 88 feet
Thickness (in):

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size
88	119		.25
null	null		.12

Casing from	to feet	Diameter	Material	Drive Shoe
0	88	10.75	Other	null

GENERAL REMARKS:

LITHOLOGY INFORMATION:

From	0 to 19.7 Ft.	GRAVELY CLAY	0	nothing entered
From	19.7 to 21.4 Ft.	GRAVELY CLAY	0	nothing entered
From	21.4 to 43 Ft.	GRAVELY CLAY COLLUVIUM	0	nothing entered
From	43 to 65 Ft.	SILTY CLAY - LACUSTRINE	0	nothing entered
From	65 to 70 Ft.	GRAVEL- DIRTY - WATER	0	nothing entered
From	70 to 98.43 Ft.	CLEANER GRAVEL	0	nothing entered
From	98.43 to 118 Ft.	GRAVEL SILTY	0	nothing entered
From	118.4 to 121.4 Ft.	SANDSTONE AND SHALE	0	nothing entered

- Return to Main
- Return to Search Options
- Return to Search Criteria

BRITISH COLUMBIA

Greenhills Well 10

Report 1 - Detailed Well Record

GH_POTW10

Well Tag Number: 85218 Owner: ELK VALLEY COAL - GREENHILLS OPERATION Address: Area: GREENHILLS WELL LOCATION: Land District District Lot: 4588 Plan: 11279 Lot: 1 Township: Section: Range: Indian Reserve: Meridian: Block: Quarter: Island: BCGS Number (NAD 83): Well: 5 Class of Well: Subclass of Well: Orientation of Well: Status of Well: Well Use: Observation Well Number: Observation Well Status: Construction Method: Diameter: 8" inches Casing drive shoe: Well Depth: 176 feet Elevation: feet (ASL) Final Casing Stick Up: inches Well Cap Type: Bedrock Depth: feet Lithology Info Flag: Y File Info Flag: N Sieve Info Flag: N Screen Info Flag: N Site Info Details: Other Info Flag: Other Info Details:	Construction Date: 2001-06-22 00:00:00 Driller: Well Identification Plate Number: 15805 Plate Attached By: Where Plate Attached: PRODUCTION DATA AT TIME OF DRILLING: Well Yield: 50 (Driller's Estimate) Development Method: Pump Test Info Flag: N Artesian Flow: Artesian Pressure (ft): Static Level: WATER QUALITY: Character: Colour: Odour: Well Disinfected: N EMS ID: Water Chemistry Info Flag: N Field Chemistry Info Flag: Site Info (SEAM): N Water Utility: N Water Supply System Name: GREENHILLS WATER SUPPLY SYSTEM Water Supply System Well Name: WELL 10 SURFACE SEAL: Flag: N Material: Method: Depth (ft): Thickness (in): WELL CLOSURE INFORMATION: Reason For Closure: Method of Closure: Closure Sealant Material: Closure Backfill Material: Details of Closure:

Screen from	to feet
Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe
0	176	null	Other	null

GENERAL REMARKS:
WATER QUALITY GUARANTEED BY CONTRACTOR

LITHOLOGY INFORMATION:

From	0	to	58	Ft.	CLAY	0 nothing entered
From	58	to	78	Ft.	GRAVEL AND BOULDERS	0 nothing entered
From	78	to	110	Ft.	CLAY AND GRAVEL	0 nothing entered
From	110	to	176	Ft.	COURSE GRAVEL	0 nothing entered

- Return to Main
- Return to Search Options
- Return to Search Criteria

BRITISH COLUMBIA

Greenhills Well 15

Report 1 - Detailed Well Record

GH_POTW15

Well Tag Number: 85221 Owner: ELK VALLEY COAL - GREENHILLS OPERATION Address: Area: WELL LOCATION: Land District District Lot: 4588 Plan: 11279 Lot: 1 Township: Section: Range: Indian Reserve: Meridian: Block: Quarter: Island: BCGS Number (NAD 83): Well: 7 Class of Well: Subclass of Well: Orientation of Well: Status of Well: Well Use: Observation Well Number: Observation Well Status: Construction Method: Diameter: inches Casing drive shoe: Well Depth: 144 feet Elevation: feet (ASL) Final Casing Stick Up: inches Well Cap Type: Bedrock Depth: feet Lithology Info Flag: Y File Info Flag: N Sieve Info Flag: N Screen Info Flag: N Site Info Details: Other Info Flag: Other Info Details:	Construction Date: 2001-11-01 00:00:00 Driller: Well Identification Plate Number: 15803 Plate Attached By: KIMBERLY RASMUSSEN Where Plate Attached: WELL CASING PRODUCTION DATA AT TIME OF DRILLING: Well Yield: 100 (Driller's Estimate) Development Method: Pump Test Info Flag: N Artesian Flow: Artesian Pressure (ft): Static Level: 11 feet WATER QUALITY: Character: Colour: Odour: Well Disinfected: N EMS ID: Water Chemistry Info Flag: N Field Chemistry Info Flag: Site Info (SEAM): N Water Utility: N Water Supply System Name: GREENHILLS WATER SUPPLY SYSTEM Water Supply System Well Name: WELL 15 SURFACE SEAL: Flag: N Material: Method: Depth (ft): Thickness (in): WELL CLOSURE INFORMATION: Reason For Closure: Method of Closure: Closure Sealant Material: Closure Backfill Material: Details of Closure:

Screen from	to feet
Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe
0	144	null	Other	null

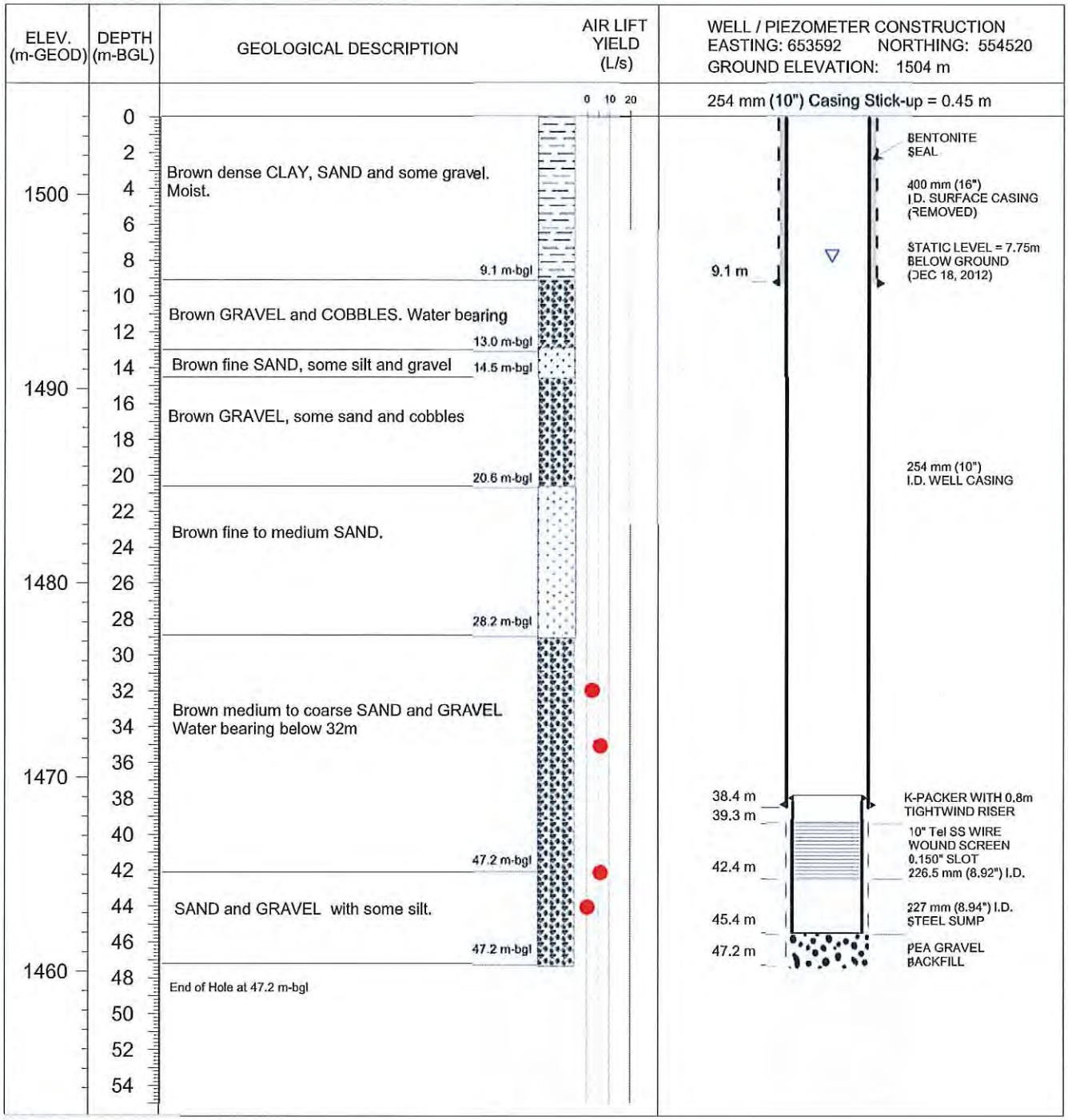
GENERAL REMARKS:
WATER QUALITY GUARANTEED BY CONTRACTOR

LITHOLOGY INFORMATION:

From	0	to	7	Ft.	FILL	0 nothing entered
From	7	to	15	Ft.	CLAY AND GRAVEL	0 nothing entered
From	15	to	125	Ft.	SILTY CLAY	0 nothing entered
From	125	to	144	Ft.	COARSE GRAVEL AND COBBLE	0 nothing entered

- Return to Main
- Return to Search Options
- Return to Search Criteria

H:\Project\3148\Well Log\Well17 Greenhill.grf



LEGEND

- Clay
- Gravel
- Sand

Note:
Coordinates and elevation not surveyed

DRILLING CONTRACTOR:	J.R. Drilling Ltd.
DRILLING METHOD:	DUAL ROTARY
START DATE:	19-Nov-12
END DATE:	21-Nov-12
HYDROGEOLOGY:	Eric Pastora

KERR WOOD LEIDAL ASSOCIATES LTD.
TECK COAL LTD. - GREENHILLS OPERATIONS
GROUNDWATER SUPPLY ASSESSMENT

PITEAU ASSOCIATES
GEOTECHNICAL AND HYDROGEOLOGICAL CONSULTANTS

WELL 17 LOG

BY	DATE
EP	JAN 13
APPROVED	FIG.
ATH	2

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 3rd-4th, 2016

Site Location: Elkford, BC

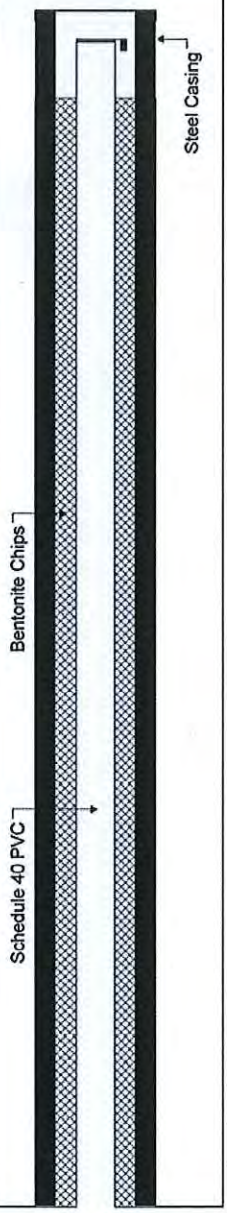
Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

Sheet: 1 of 14

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	Backfill details
		Ground Surface	0.00						
		TOPSOIL TOPSOIL, silt, fine sand and fine sub-angular/sub-rounded gravel with rootlets, grayish-brown, dry (likely fill)	0.00						
			-2.00						
		TOPSOIL TOPSOIL, silt, fine sand and fine to medium sub-angular/sub-rounded gravel with rootlets and wood debris, dark brown, dry (likely native topsoil)	2.00						
			-2.50						
		SILT, SAND and GRAVEL SILT, SAND and GRAVEL, light brown, fine sand, fine to medium sub-angular/sub-rounded gravel with rootlets, dry Moist from 4.5m	2.50						
			-5.00						
			5.00						



Well location: Rail Loop

Depth to water level (TOC): -

Date of water level: -

Borehole diameter: 15.24cm

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 82.5-79.5

Depth of well (TOC): -

Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07
Drilling Company: JR Drilling
Client: Teck Coal Greenhills Operation
Drilling Method: Dual Rotary
Date Drilled: September 3rd-4th, 2016
Logged by: TK
Site Location: Elkford, BC
Sheet: 2 of 14

SUBSURFACE PROFILE			SAMPLE						
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	Backfill details
17		**SAND and GRAVEL (TILL)** SAND and GRAVEL, fine grained, fine to coarse sub-angular/sub-rounded gravel up to 2cm, moist							
18									
19			-6.00						
6		**SILTY CLAY (TILL)** SILTY CLAY, trace fine sand, some blocky silt, dark brown, homogenous, low to moderate plasticity, saturated	6.00						
20									
21									
22									
23	7								
24									
25									
26									
8									
27									
28									
29									
9									
30									
31									
32									
10									
33									
34									
35									
36									
11									

Well location: Rail Loop
Well casing diameter: 50.8mm
Depth of well (TOC): -
Depth to water level (TOC): -
Well casing material: Schedule 40 PVC
Well Elevation (TOC): -
Date of water level: -
Well screen slot size: 0.25mm
Ground Elevation: -
Borehole diameter: 15.24cm
Well screen interval (bgs): 82.5-79.5

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 3rd-4th, 2016

Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

Sheet: 3 of 14

SUBSURFACE PROFILE			SAMPLE						
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	Backfill details
37									
38									
39									
12									
40									
41									
42									
13									
43									
44									
45									
46									
14									
47									
48									
49									
15									
50									
51									
52									
16									
53									
54									
55									
17									
56									

Well location: Rail Loop

Depth to water level (TOC): -

Date of water level: -

Borehole diameter: 15.24cm

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 82.5-79.5

Depth of well (TOC): -

Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07
Drilling Company: JR Drilling
Client: Teck Coal Greenhills Operation
Drilling Method: Dual Rotary
Date Drilled: September 3rd-4th, 2016
Logged by: TK
Site Location: Elkford, BC
Sheet: 4 of 14

SUBSURFACE PROFILE			SAMPLE						Backfill details
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	
57									
58									
59	18								
60									
61									
62	19								
63									
64									
65									
66	20								
67									
68									
69	21								
70									
71									
72	22		-22.00						
		SILTY SAND and GRAVEL (TILL)	22.00						
73		SILTY SAND and GRAVEL, coarse grained, gravel fine to coarse (~1cm), sub-angular, saturated							
74		Increasingly clayey, with finer sub-angular gravel from 24-25mbgs							
75	23	Decreasing gravel/sand with depth, clay/silt from 30-31 mbgs is more consolidated							
76									

Well location: Rail Loop
Well casing diameter: 50.8mm
Depth of well (TOC): -
Depth to water level (TOC): -
Well casing material: Schedule 40 PVC
Well Elevation (TOC): -
Date of water level: -
Well screen slot size: 0.25mm
Ground Elevation: -
Borehole diameter: 15.24cm
Well screen interval (bgs): 82.5-79.5

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 3rd-4th, 2016

Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

Sheet: 5 of 14

SUBSURFACE PROFILE			SAMPLE						
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	Backfill details
77									
78									
79	24								
80									
81									
82	25								
83									
84									
85									
86	26								
87									
88									
89	27								
90									
91									
92	28								
93									
94									
95	29								
96									

Well location: Rail Loop

Depth to water level (TOC): -

Date of water level: -

Borehole diameter: 15.24cm

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 82.5-79.5

Depth of well (TOC): -

Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07
Client: Teck Coal Greenhills Operation
Date Drilled: September 3rd-4th, 2016
Site Location: Elkford, BC

Drilling Company: JR Drilling
Drilling Method: Dual Rotary
Logged by: TK

Sheet: 6 of 14

SUBSURFACE PROFILE			SAMPLE						
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	Backfill details
97									
98									
30									
99									
00									
01									
31			-31.00						
02		**SILT, SAND and GRAVEL (TILL)** SILT, SAND and GRAVEL, coarse sand, fine to medium sub-angular gravel, saturated	31.00						
03		Blocky silt/clay at 34 and 42 mbgs							
04									
05	32								
06									
07									
08									
33									
09									
10									
11									
34									
12									
13									
14									
15	35								
16									

Well location: Rail Loop
Depth to water level (TOC): -
Date of water level: -
Borehole diameter: 15.24cm

Well casing diameter: 50.8mm
Well casing material: Schedule 40 PVC
Well screen slot size: 0.25mm
Well screen interval (bgs): 82.5-79.5

Depth of well (TOC): -
Well Elevation (TOC): -
Ground Elevation: -

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 3rd-4th, 2016

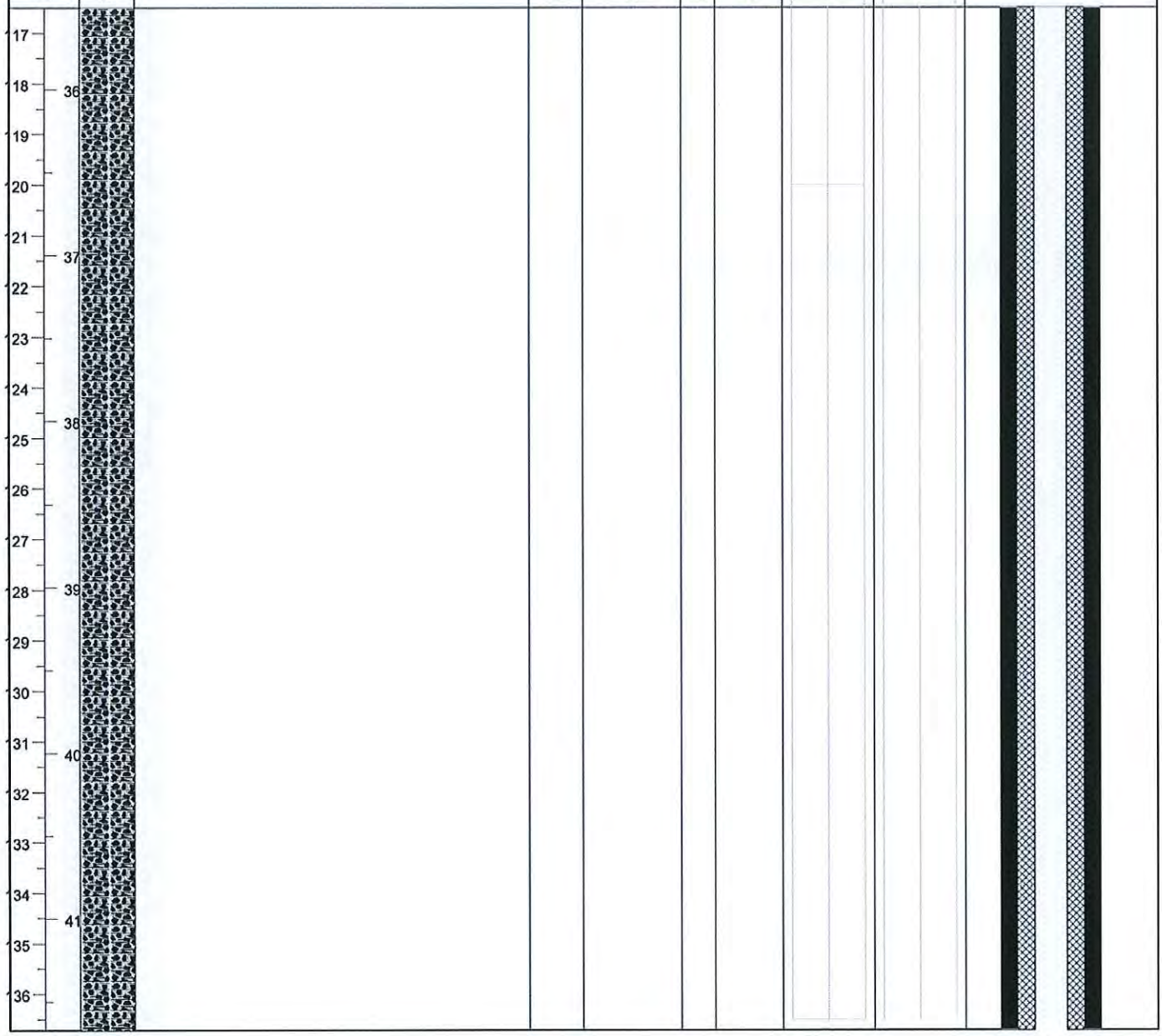
Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

SUBSURFACE PROFILE			SAMPLE						Backfill details
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	



Well location: Rail Loop

Depth to water level (TOC): -

Date of water level: -

Borehole diameter: 15.24cm

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 82.5-79.5

Depth of well (TOC): -

Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07
Drilling Company: JR Drilling
Client: Teck Coal Greenhills Operation
Drilling Method: Dual Rotary
Date Drilled: September 3rd-4th, 2016
Logged by: TK
Site Location: Elkford, BC
Sheet: 8 of 14

SUBSURFACE PROFILE			SAMPLE						Backfill details
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	
37									
38	42								
39									
40									
41	43		-43.00						
42		**SAND and GRAVEL (TILL)** SAND and GRAVEL, coarse sand, fine to coarse sub-angular gravel, saturated Fine content increases from 46-48 mbgs	43.00						
43									
44	44								
45									
46									
47	45								
48									
49									
50									
51	46								
52									
53									
54	47								
55									
56									

Well location: Rail Loop
Well casing diameter: 50.8mm
Depth of well (TOC): -
Depth to water level (TOC): -
Well casing material: Schedule 40 PVC
Well Elevation (TOC): -
Date of water level: -
Well screen slot size: 0.25mm
Ground Elevation: -
Borehole diameter: 15.24cm
Well screen interval (bgs): 82.5-79.5

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

Date Drilled: September 3rd-4th, 2016

Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK

SUBSURFACE PROFILE			SAMPLE						
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	Backfill details
57			-48.00						
48		SILTY CLAY (TILL) SILTY CLAY with trace sub-angular medium gravel, dark brown, competent, high plasticity, saturated	48.00						
58									
59									
60									
49									
61									
62									
63									
64									
50									
65									
66									
67									
51									
68									
69									
70									
52									
71									
72									
73									
74									
53									
75									
76									

Well location: Rail Loop

Depth to water level (TOC): -

Date of water level: -

Borehole diameter: 15.24cm

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 82.5-79.5

Depth of well (TOC): -

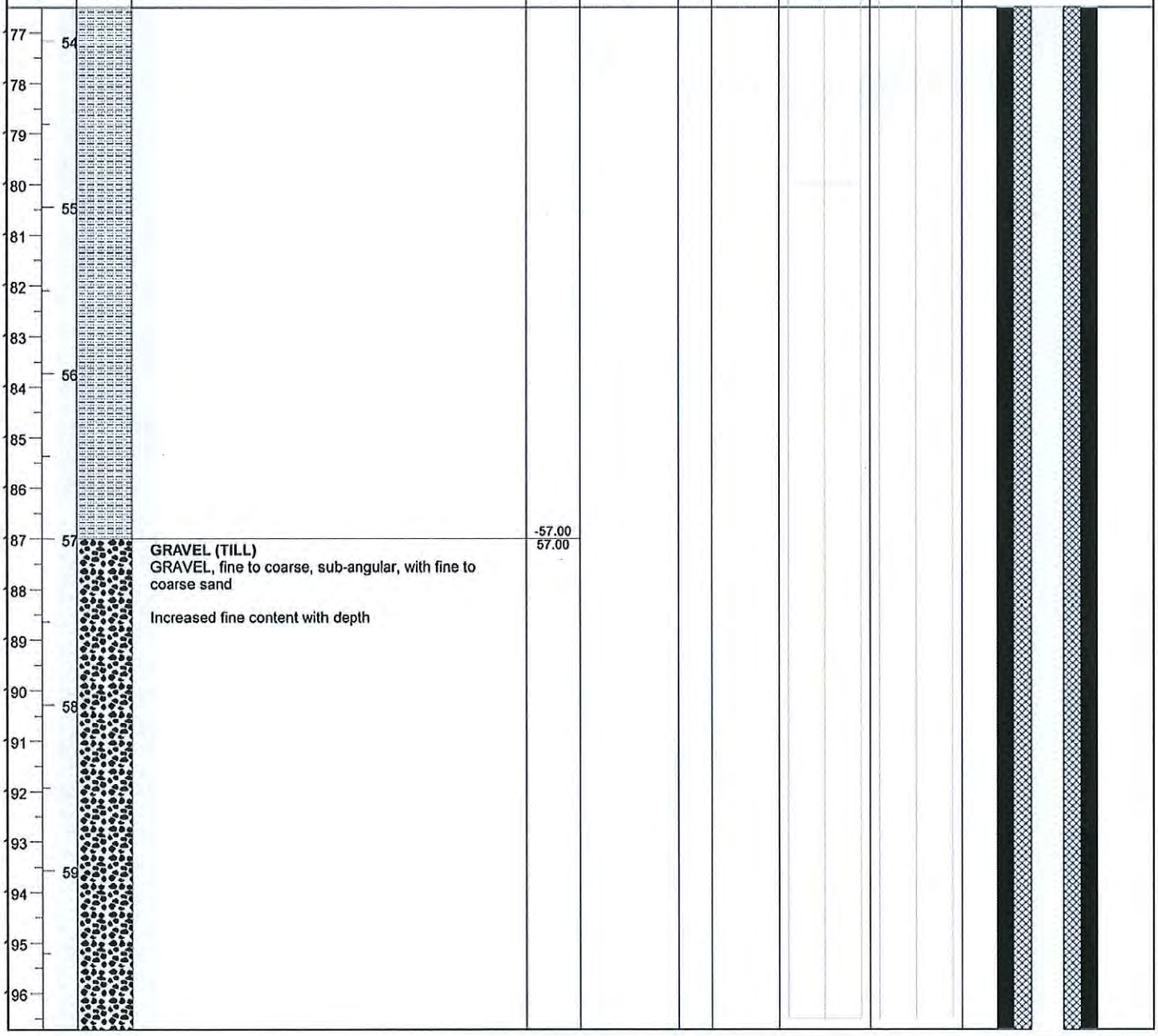
Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07
Drilling Company: JR Drilling
Client: Teck Coal Greenhills Operation
Drilling Method: Dual Rotary
Date Drilled: September 3rd-4th, 2016
Logged by: TK
Site Location: Elkford, BC
Sheet: 10 of 14



Well location: Rail Loop
Well casing diameter: 50.8mm
Depth of well (TOC): -
Depth to water level (TOC): -
Well casing material: Schedule 40 PVC
Well Elevation (TOC): -
Date of water level: -
Well screen slot size: 0.25mm
Ground Elevation: -
Borehole diameter: 15.24cm
Well screen interval (bgs): 82.5-79.5

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07
Client: Teck Coal Greenhills Operation
Date Drilled: September 3rd-4th, 2016
Site Location: Elkford, BC

Drilling Company: JR Drilling
Drilling Method: Dual Rotary
Logged by: TK

Sheet: 11 of 14

SUBSURFACE PROFILE			SAMPLE						
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	Backfill details
97 60									
98									
99									
200 61									
201									
202									
203			-62.00						
62		**CLAY (TILL)** CLAY, with trace fine to coarse sub-angular gravel (~ 1-2cm), competent and very firm, high plasticity, moist/wet High difficulty drilling through this section	62.00						
204									
205									
206									
63 207									
208									
209									
210 64									
211									
212									
213									
65 214									
215									
216			-66.00						
			66.00						

Well location: Rail Loop
Depth to water level (TOC): -
Date of water level: -
Borehole diameter: 15.24cm

Well casing diameter: 50.8mm
Well casing material: Schedule 40 PVC
Well screen slot size: 0.25mm
Well screen interval (bgs): 82.5-79.5

Depth of well (TOC): -
Well Elevation (TOC): -
Ground Elevation: -

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07
Drilling Company: JR Drilling
Client: Teck Coal Greenhills Operation
Drilling Method: Dual Rotary
Date Drilled: September 3rd-4th, 2016
Logged by: TK
Site Location: Elkford, BC
Sheet: 12 of 14

SUBSURFACE PROFILE			SAMPLE						Backfill details
Depth	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	
217	66	**SAND and GRAVEL (TILL)** SAND and GRAVEL, fine to coarse grained sand, fine to coarse (~1-2cm) sub-angular gravel, saturated							
218									
219									
220	67								
221									
222									
223	68								
224									
225									
226	69								
227									
228									
229									
230	70								
231									
232									
233	71								
234									
235									
236	72								

Well location: Rail Loop
Well casing diameter: 50.8mm
Depth of well (TOC): -
Depth to water level (TOC): -
Well casing material: Schedule 40 PVC
Well Elevation (TOC): -
Date of water level: -
Well screen slot size: 0.25mm
Ground Elevation: -
Borehole diameter: 15.24cm
Well screen interval (bgs): 82.5-79.5

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07

Client: Teck Coal Greenhills Operation

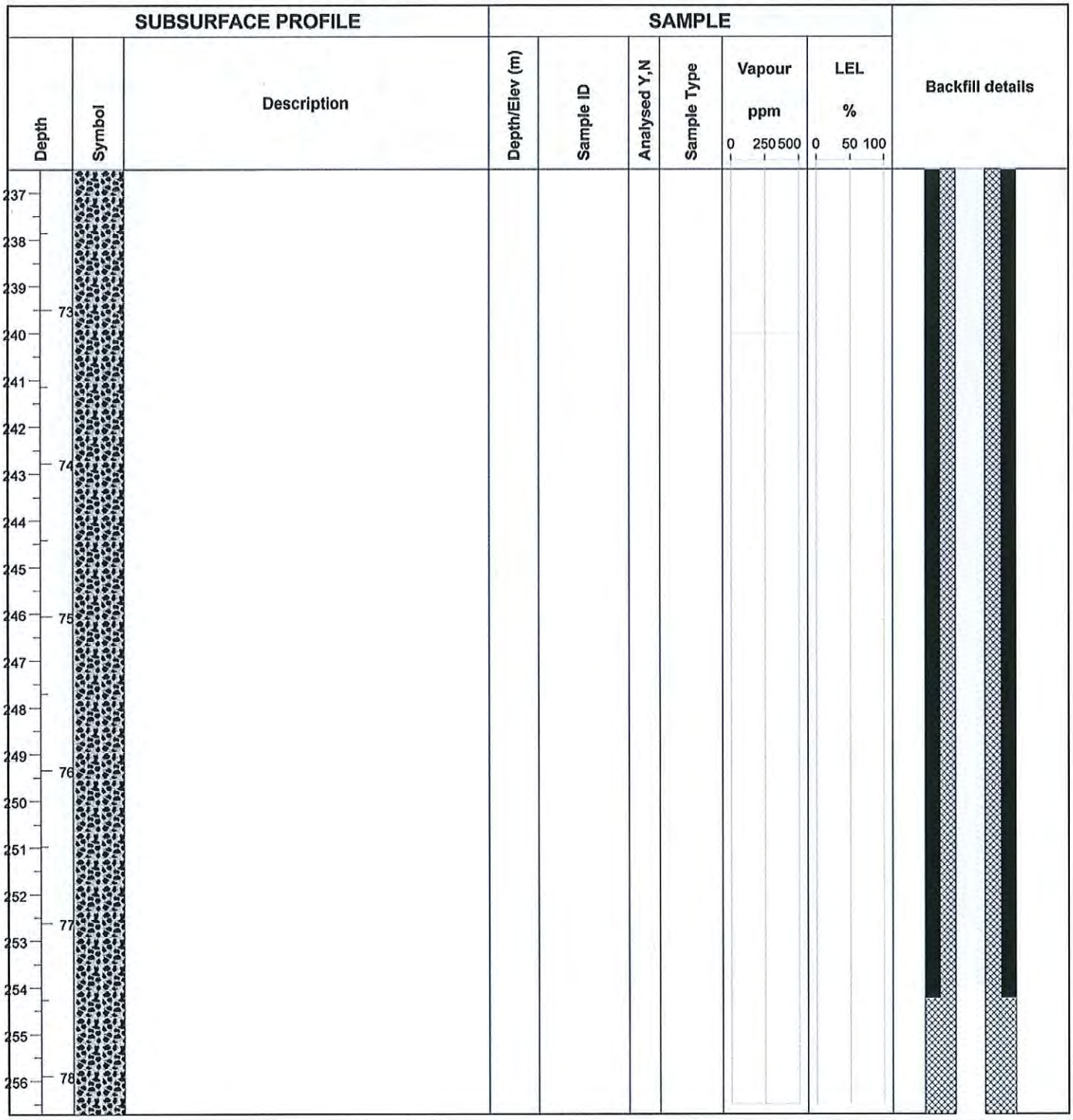
Date Drilled: September 3rd-4th, 2016

Site Location: Elkford, BC

Drilling Company: JR Drilling

Drilling Method: Dual Rotary

Logged by: TK



Well location: Rail Loop

Depth to water level (TOC): -

Date of water level: -

Borehole diameter: 15.24cm

Well casing diameter: 50.8mm

Well casing material: Schedule 40 PVC

Well screen slot size: 0.25mm

Well screen interval (bgs): 82.5-79.5

Depth of well (TOC): -

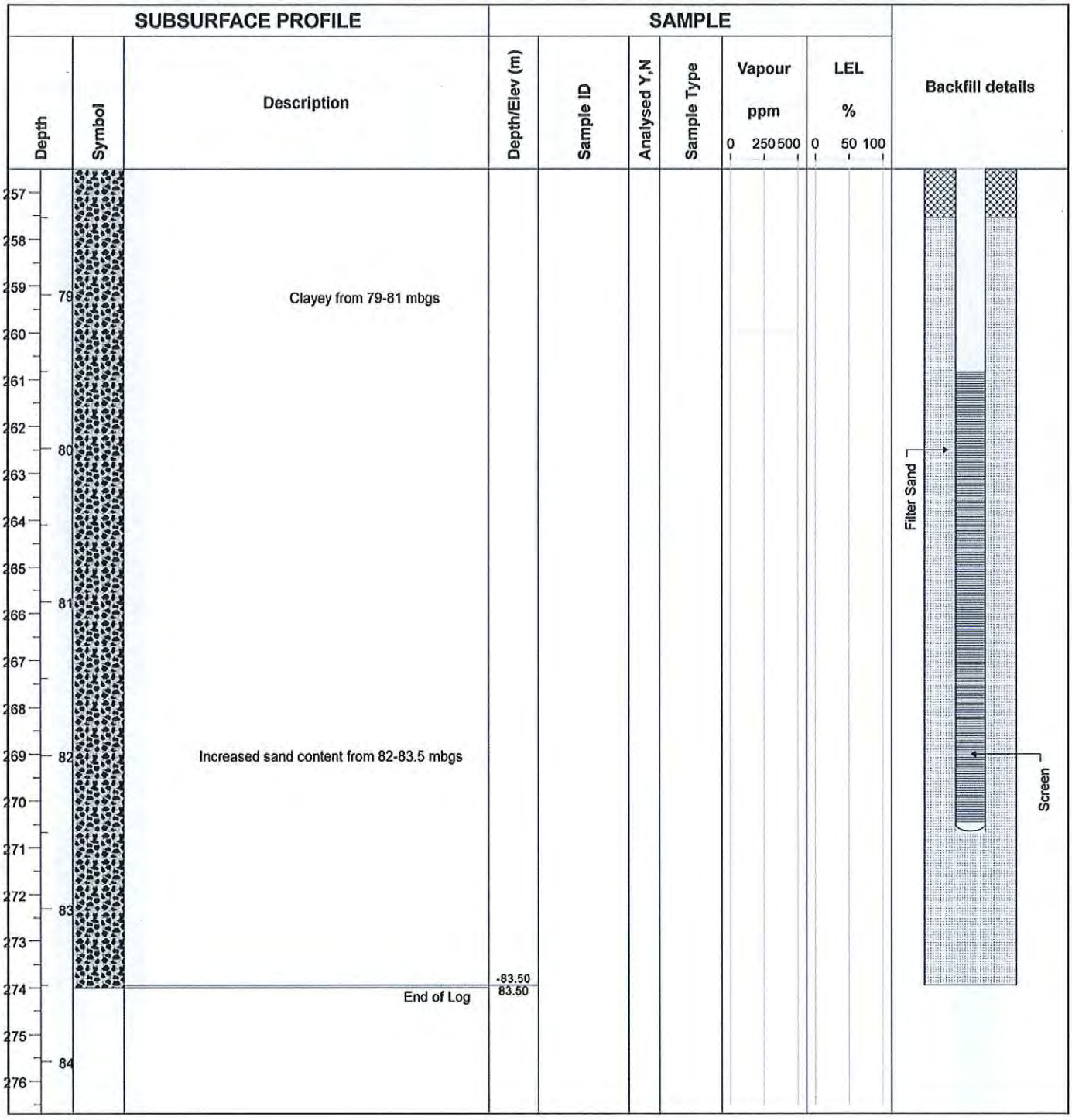
Well Elevation (TOC): -

Ground Elevation: -

Log of Monitoring Well: GH_MW-RLP-1D

HEMMERA

Project Name/No: 577-016.07
Drilling Company: JR Drilling
Client: Teck Coal Greenhills Operation
Drilling Method: Dual Rotary
Date Drilled: September 3rd-4th, 2016
Logged by: TK
Site Location: Elkford, BC
Sheet: 14 of 14



Well location: Rail Loop
Well casing diameter: 50.8mm
Depth of well (TOC): -
Depth to water level (TOC): -
Well casing material: Schedule 40 PVC
Well Elevation (TOC): -
Date of water level: -
Well screen slot size: 0.25mm
Ground Elevation: -
Borehole diameter: 15.24cm
Well screen interval (bgs): 82.5-79.5

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_BCgw

SHEET 1 OF 3

LOCATION: See Location Plan
N: 6509659 E: 655381

BORING DATE: October 22, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80); nat V. +, rem V. ⊕; Q - ●, U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	Ground Surface		353.26									Stick-up =0.86 m
		SANDY GRAVEL, fine-grained with occasional coarse grains, rounded to sub-rounded, moderately graded, dry, very loose		0.00									
1													
				351.74									
		GRAVEL, trace sand, fine-grained with occasional coarse grains, rounded to sub-rounded, poorly graded, very loose		1.52									
2		— Moist at 2.1 m											12 Nov 2013 ▽
3													
4													
5													Bentonite Chips
6				347.17									
		Silty SANDY GRAVEL, fine-grained with occasional coarse grains, sub-rounded to sub-angular, poorly graded, wet, very loose		6.10									
7													
8													
9													
				343.51									
				9.75									
10		CONTINUED NEXT PAGE											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_BCgw

SHEET 2 OF 3

LOCATION: See Location Plan
N: 5509659 E: 655381

BORING DATE: October 22, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	GRAVEL, some sand, trace silt, fine-grained, sub-angular to angular, poorly graded, wet, very loose *(continued)*											
11													
12													
13													Bentonite Chips
14													
15		— Occasional coarse grains from 15.2 m											
16													
17													Silica Sand
18													
19													Slotted Section
20		*CONTINUED NEXT PAGE*											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_BCgw

SHEET 3 OF 3

LOCATION: Soo Location Plan

N: 5509659 E: 655381

BORING DATE: October 22, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	GRAVEL, some sand, trace silt, fine-grained, sub-angular to angular, poorly graded, wet, very loose *(continued)*									Stotted Section
21											
22		Sandy SILTY GRAVEL, fine-grained, sub-angular to angular, poorly graded, wet, very loose		331.17 22.10							Silica Sand
23		End of BOREHOLE. NOTES: Standpipe installed to 20.7 m upon well completion. Groundwater level measured at 2.4 mbgs on October 23, 2013. Groundwater level measured at 2.2 mbgs on November 12, 2013.		330.10 23.18							
24											
25											
26											
27											
28											
29											
30											

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ECgw

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: October 27, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5506384 E: 660795

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		406.30							Stick-up +0.74 m
0	Solid 127 mm (ID) Casing 152.4 mm (OD) / JR Drilling	GRAVELLY SAND, medium and coarse-grained sand with occasional fine gravel grains, rounded to sub-rounded, moderately graded, dry, very loose		0.00 / 404.77							16 Nov 2014 ▽ Bentonite Chips
2		SAND, trace gravel, medium-grained, rounded to sub-rounded, moderately graded, dry, very loose		1.52 / 402.49							Silica Sand
4		CLAY and SAND, medium-grained with occasional coarse grains, rounded to sub-rounded, moderately graded, moist, firm		3.81 / 401.12							Slotted Section / Silica Sand
6		SANDY CLAY, medium-grained with occasional coarse grains, rounded to sub-rounded, moderately graded, moist, firm		5.18 / 399.44							
7		CLAY, some sand, medium-grained, rounded to sub-rounded, moderately graded, moist, semi-firm		6.86							Bentonite Pellets
10		CONTINUED NEXT PAGE									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ECgw

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: October 27, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5506384 E: 660795

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q- ● rem V. ⊕ U- ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	JR Drilling	CLAY, some sand, medium-grained, rounded to sub-rounded, moderately graded, moist, semi-firm *(continued)*		395.33							Bentonite Pellets
11		End of BOREHOLE.		10.97							
12		NOTES: Standpipe installed to 4.1 m upon well completion. Groundwater level measured at 1.6 mbgs on November 12, 2013.									
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwD

SHEET 1 OF 4

LOCATION: See Location Plan
N: 5510952 E: 651379

BORING DATE: 29 and 31 October, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. + Q- ●, rem V. ⊕ U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		339.85									Stick-up =0.71 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SILTY SAND, fine-grained with occasional medium grains, rounded to sub-rounded, moderately graded, minor organics (roots), dry, very loose		0.00 / 338.33									
1		SAND, medium and coarse-grained, and fine-grained with some coarse-grained GRAVEL, poorly sorted, sub-rounded, sub-angular and angular clasts, dry, very loose		1.52									
2													
3													
4													16 Nov 2013 ▽
5													Bentonite Chips
6													
7													
8													
9													
10				329.95 / 9.91									
		CONTINUED NEXT PAGE											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwD

SHEET 2 OF 4

LOCATION: See Location Plan

N: 5510952 E: 651379

BORING DATE: 29 and 31 October, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SANDY GRAVEL, fine-grained with some coarse grains, sub-rounded to sub-angular, poorly sorted, wet, very loose *(continued)*									
11											
12											
13											
14											
15											Bentonite Chips
16											
17		SAND, medium to coarse-grained, some fine-grained gravel, angular to sub-angular, moderately sorted, wet, very loose		322.94 / 16.92							
18											
19											
20		*CONTINUED NEXT PAGE*									

DEPTH SCALE 1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwD

SHEET 3 OF 4

LOCATION: See Location Plan
N: 5510952 E: 651379

BORING DATE: 29 and 31 October, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q- ● rem V. ⊕ U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SAND, medium to coarse-grained, some fine-grained gravel, angular to sub-angular, moderately sorted, wet, very loose *(continued)*									Bentonite Chips
21											
22											
23											
24											Silica Sand
25											
26											
27											Slotted Section
28		SILTY SAND, fine to medium-grained, occasional angular gravel, rounded to sub-rounded, moderately graded, dry, very loose (BEDROCK)		311.96 / 27.69							
29											Silica Sand / Bentonite Pellets / Slough
30		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwD

SHEET 4 OF 4

LOCATION: See Location Plan

BORING DATE: 29 and 31 October, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5510952 E: 651379

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
30	JR Drilling	SILTY SAND, fine to medium-grained, occasional angular gravel, rounded to sub-rounded, moderately graded, dry, very loose (BEDROCK) *(continued)*		309.07							Slough
31		End of BOREHOLE.		30.78							
32		NOTES: Standpipe installed to 28.9 m upon well completion. Groundwater level measured at 4.6 mbgs on November 16, 2013.									
33											
34											
35											
36											
37											
38											
39											
40											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwS

SHEET 1 OF 2

LOCATION: See Location Plan
N: 5510955 E: 651374

BORING DATE: October 30, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○; 20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊖W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	Ground Surface		339.85							Stick-up +0.96 m
		SAND, medium and coarse-grained with some fine grains, rounded to sub-rounded, moderately graded, dry, very loose		0.00							
1											
2											
3											
4											
5											16 Nov 2013 ▽ Bentonite Chips
6											
				333.15							
7		SAND, medium to coarse-grained, some fine-grained gravel, sub-rounded, sub-angular, moderately sorted, dry, very loose		6.71							
8											
				331.32							
9		SAND, medium to coarse-grained, some fine-grained gravel, sub-rounded, sub-angular and angular, moderately sorted, wet, very loose		8.53							
10											
		CONTINUED NEXT PAGE									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwS

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: October 30, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5510955 E: 651374

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp — W — Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID); Casing 152.4 mm (OD); JR Drilling	SAND, medium to coarse-grained, some fine-grained gravel, sub-rounded, sub-angular and angular, moderately sorted, wet, very loose *(continued)*									Bentonite Chips
11											
12											
13											
14											Silica Sand
15											
16											Slotted Section
17				322.24							
		End of BOREHOLE.		17.61							
18		NOTES: Standpipe installed to 17.6 m upon well completion. Groundwater level measured at 8.2 mbgs on October 30, 2013. Groundwater level measured at 4.7 mbgs on November 16, 2013.									
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_GV3gw

SHEET 1 OF 3

LOCATION: See Location Plan

BORING DATE: October 23, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5522255 E: 656580

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q- ● rem V. ⊕ U- ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		400.51							Stick-up +0.91 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SANDY GRAVEL, fine-grained, sub-angular to angular, moderately graded, dry, very loose		0.00							
1				398.98							
2		SAND, some gravel, fine to coarse-grained, sub-rounded to sub-angular, moderately graded, dry, very loose		1.52							
3				397.61							
		SANDY GRAVEL, fine-grained, sub-angular to angular, moderately graded, dry, very loose		2.90							
4				395.94							
5		SAND, some gravel, localized thin zones of gravel, fine to coarse-grained, sub-rounded to sub-angular, moderately graded, moist, very loose		4.57							Bentonite Chips
6											
7											
8											
9											
10											15 Nov 2013 ▽
		CONTINUED NEXT PAGE									

DEPTH SCALE 1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_GV3gw

SHEET 2 OF 3

LOCATION: See Location Plan

N: 5522255 E: 656580

BORING DATE: October 23, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SAND, some gravel, localized thin zones of gravel, fine to coarse-grained, sub-rounded to sub-angular, moderately graded, moist, very loose *(continued)*									
11											
12											
13		SILTY GRAVEL, fine-grained, sub-rounded to sub-angular, poorly graded, wet, very loose		367.55 12.95							
14											
15		GRAVEL, fine-grained, sub-rounded to sub-angular, well graded, moist, very loose		365.88 14.63							Bentonite Chips
16				384.35 16.15							
17		SAND, some gravel, fine to coarse-grained, sub-rounded to sub-angular, moderately graded, moist, very loose									
18				382.98 17.53							
19		GRAVEL, some silt, fine-grained, sub-rounded to sub-angular, poorly graded, moist, very loose									
20		SILTY GRAVEL, fine-grained, sub-rounded to sub-angular, poorly graded, wet, very loose		381.46 19.05							
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_GV3gw

SHEET 3 OF 3

LOCATION: See Location Plan

N: 5522255 E: 656580

BORING DATE: October 23, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q- ● rem V. ⊕ U- ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SILTY GRAVEL, fine-grained, sub-rounded to sub-angular, poorly graded, wet, very loose *(continued)*		379.63							
21		SILTY GRAVEL, fine and coarse-grained, sub-angular to angular, poorly graded, wet, very loose		20.88							Bentonite Chips
22											
23											Silica Sand
24											Slotted Section
25		End of BOREHOLE.		375.51 25.00							Silica Sand
26		NOTES: Standpipe installed to 24.4 m upon well completion. Groundwater level measured at 9.9 mbgs on November 15, 2013.									
27											
28											
29											
30											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_LSgw

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: October 24, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5514731 E: 653274

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		345.03							Stick-up =0.93 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	FILL - Sand sized particles, medium to coarse-grained, sub-rounded to sub-angular, well graded, dark black carbonaceous, moist, very loose		0.00							
1											
				343.51							
		SANDY GRAVEL, some silt, fine-grained, sub-rounded to sub-angular, poorly graded, moist, very loose		1.52							
2											Bentonite Chips
3											14 Nov 2013 ▽
				341.22							
		GRAVELY SAND, coarse-grained with fine-grained gravel, sub-rounded to sub-angular, poorly graded, moist, very loose		3.81							
4											
5											Silica Sand
6											Slotted Section
				338.16							
7		SANDY SILT, fine to medium-grained, wet, mud		6.86							
8											Silica Sand
9											
10											
		CONTINUED NEXT PAGE									

DEPTH SCALE 1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_LSgw

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: October 24, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5514731 E: 653274

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	JR Drilling	SANDY SILT, fine to medium-grained, wet, mud *(continued)*		334.36							Silica Sand
		End of BOREHOLE.		10.67							
11		NOTES: Standpipe installed to 6.7 m upon well completion. Groundwater level measured at 3.4 mbgs on November 14, 2013.									
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwD

SHEET 1 OF 5

LOCATION: See Location Plan
N: 5511616 E: 653475

BORING DATE: November 3, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		344.73									Stick-up =0.84 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SAND, coarse and medium-grained, and fine-grained GRAVEL, rounded to sub-rounded, moderately graded, wet, very loose		0.00									
3													15 Nov 2013 ▽
		SAND, fine and medium-grained, sub-rounded to sub-angular, well graded, dry, very loose		341.07 3.66									
5													Bentonite Pellets
				339.09									
6		SILT, some fine-grained sand, well graded, very loose --- Wet at 5.8 m		5.64									
				336.65									
8		CLAY, some fine-grained sand, well-sorted, moist, compact		8.08									
10		*CONTINUED NEXT PAGE*											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwD

SHEET 2 OF 5

LOCATION: See Location Plan

N: 5511616 E: 653475

BORING DATE: November 3, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q- ● rem V. ⊕ U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	CLAY, some fine-grained sand, well-sorted, moist, compact *(continued)*									
11				333.30							
		SILT, some fine-grained sand, well graded, wet, very loose		11.43							
12											
13											
14				330.40							
		CLAY, some fine-grained sand, well-sorted, wet, soft		14.33							
15											Bentonite Pellets
				328.88							
16		CLAY, some fine-grained sand, well-sorted, moist, compact		15.85							
17											
				327.36							
18		CLAY, some fine-grained sand, well-sorted, moist, loose		17.37							
19											
20											
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwD

SHEET 3 OF 5

LOCATION: See Location Plan

N: 5511616 E: 653475

BORING DATE: November 3, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	CLAY, some fine-grained sand, well-sorted, moist, loose *(continued)*									Bentonite Pellets
21											
22											
23											Silica Sand
24											
25											
26											Slotted Section
27											
28											Silica Sand
29											
30		*CONTINUED NEXT PAGE*									Bentonite Pellets / Slough

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwD

SHEET 4 OF 5

LOCATION: See Location Plan

BORING DATE: November 3, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5511616 E: 653475

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
30	Sonic 127 mm (ID) Casing 152.4 mm (OD) / JR Drilling	CLAY, some fine-grained sand, well-sorted, moist, loose *(continued)*									
				314.26							
		CLAY, some fine-grained sand, well-sorted, wet, soft		30.45							
31											
32											
33											
34											
35											Slough
36											
37				307.54							
		SAND, coarse-grained, sub-angular to angular, well graded, wet, very loose		37.19							
38											
				305.87							
39		SILT and SAND, coarse-grained, sub-angular, moderately-sorted, wet, very loose		38.66							
40		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwD

SHEET 5 OF 5

LOCATION: See Location Plan
N: 6511616 E: 653475

BORING DATE: November 3, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q- ●, U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
40		SILT and SAND, coarse-grained, sub-angular, moderately-sorted, wet, very loose *(continued)*		304.34									
		SANDY SILT, fine-grained, moderately-sorted, wet, very loose		40.39									
41													
42													
				302.06									
43	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	CLAYEY SAND, fine-grained, some coarse-grained gravel, angular, moderately-sorted, brown, wet, very loose		42.67									Slough
44				300.69									
		GRAVEL, fine-grained, sub-rounded, moderately-sorted, grey to brown, very loose, wet		44.04									
				299.02									
45		SAND, medium-grained with some fine grains, sub-rounded, poorly graded, mainly black to grey and brown, wet		44.81									
46													
47				297.18									
		End of BOREHOLE.		47.65									
48		NOTES: Sloughing present to 29.9 m. Standpipe installed to 27.6 m upon well completion. Groundwater level measured at 2.5 mbgs on November 7, 2013. Groundwater level measured at 3.4 mbgs on November 15, 2013.											
49													
50													

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwS

SHEET 1 OF 2

LOCATION: See Location Plan

N: 5511624 E: 653476

BORING DATE: November 6, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		344.73							Stick-up =0.98 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SAND, coarse and medium-grained, and fine-grained GRAVEL, rounded to sub-rounded, moderately graded, dark brown, damp, very loose		0.00 / 343.61							
1		SAND, fine and medium-grained, sub-rounded to sub-angular, poorly graded, brown, dry, very loose		0.91							15 Nov 2013 ▽
2											
3											Bentonite Pellets
4											
		CLAYEY SILT, some fine-grained sand, dark brown to grey, moist, soft to very loose		4.57 / 340.16							
5											
		CLAYEY SILT, some fine-grained sand, dark brown to grey, wet, very soft, very loose (runny)		5.49 / 339.24							Silica Sand
6											Slotted Section
7											
8											Slough
9											
		CLAY, some fine-grained sand, well-sorted, moist, compact		9.14 / 335.58							
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwS

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: November 6, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5511624 E: 653476

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q- ● rem V. ⊕ U- ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp — W — Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	JR Drilling	CLAY, some fine-grained sand, well-sorted, moist, compact *(continued)*		334.06							Slough
		End of BOREHOLE.		10.67							
11		NOTES: Standpipe installed to 7.32 m upon well completion. Groundwater level measured at 3.8 mbgs on November 7, 2013. Groundwater level measured at 1.1 mbgs on November 15, 2013.									
12											
13											
14											
15											
16											
17											
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_OCgw

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: November 7, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5512671 E: 652460

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q- ● rem V. ⊕ U- ○)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		342.60							Stick-up =0.89 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SANDY GRAVEL, fine-grained with occasional coarse grains, rounded to sub-rounded, moderately graded, dry, very loose		0.00							
				341.07							
1		SAND and GRAVEL, coarse sand and fine gravel, rounded to sub-rounded, angular, poorly graded, moist, very loose — Hole is being drilled on the edge of a waste rock pile — Moisture at 2.1 m		1.52							
2											15 Nov 2013 ▽
3											
				338.94							
4		GRAVEL, trace sand, fine to coarse-grained, sub-rounded to rounded, poorly graded, moist, loose		3.66							
5											Bentonite Chips
6											
				335.89							
7		SAND, fine to medium-grained with occasional coarse grains, some gravel, fine to coarse-grained, sub-angular to sub-rounded, dry to moist, loose,		6.71							
8											
9											
10											
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_OCgw

SHEET 2 OF 2

LOCATION: See Location Plan
N: 5512071 E: 652480

BORING DATE: November 7, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q- ● rem V. ⊕ U- ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SAND, fine to medium-grained with occasional coarse grains, some gravel, fine to coarse-grained, sub-angular to sub-rounded, dry to moist, loose, *(continued)*											Bentonite Chips
11													Silica Sand
12													
13		SAND, fine to medium-grained with occasional coarse grains, some fine-grained gravel, sub-angular to sub-rounded, moist, loose to compact		329.79 12.80									Slotted Section
14				328.12									
15		BEDROCK		14.46									Silica Sand Tail Pipe
		End of BOREHOLE.		327.06 15.54									
16		NOTES: Standpipe installed to 14.6 m upon well completion. Groundwater level measured at 2.1 mbgs on November 15, 2013.											
17													
18													
19													
20													

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DEPTH SCALE
1 : 50

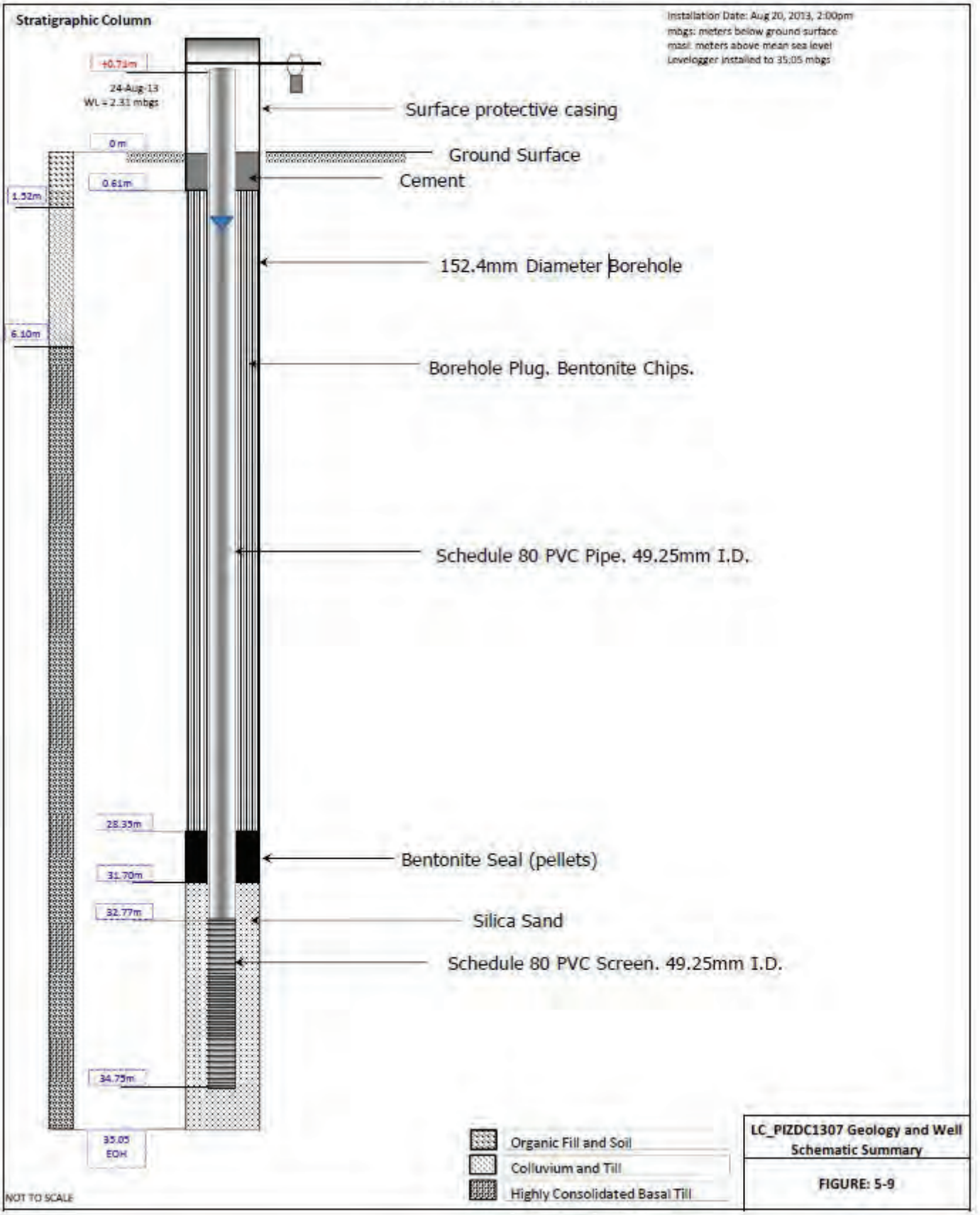
Golder Associates

LOGGED: RT
CHECKED: CD

MONITORING WELL LC_MW13-1D

Borehole: LC_PIZDC1307 **Location:** 5541229.683N, 658168.846E ; 1690.506 masl

DRY CREEK PROJECT - 13-1345-0010



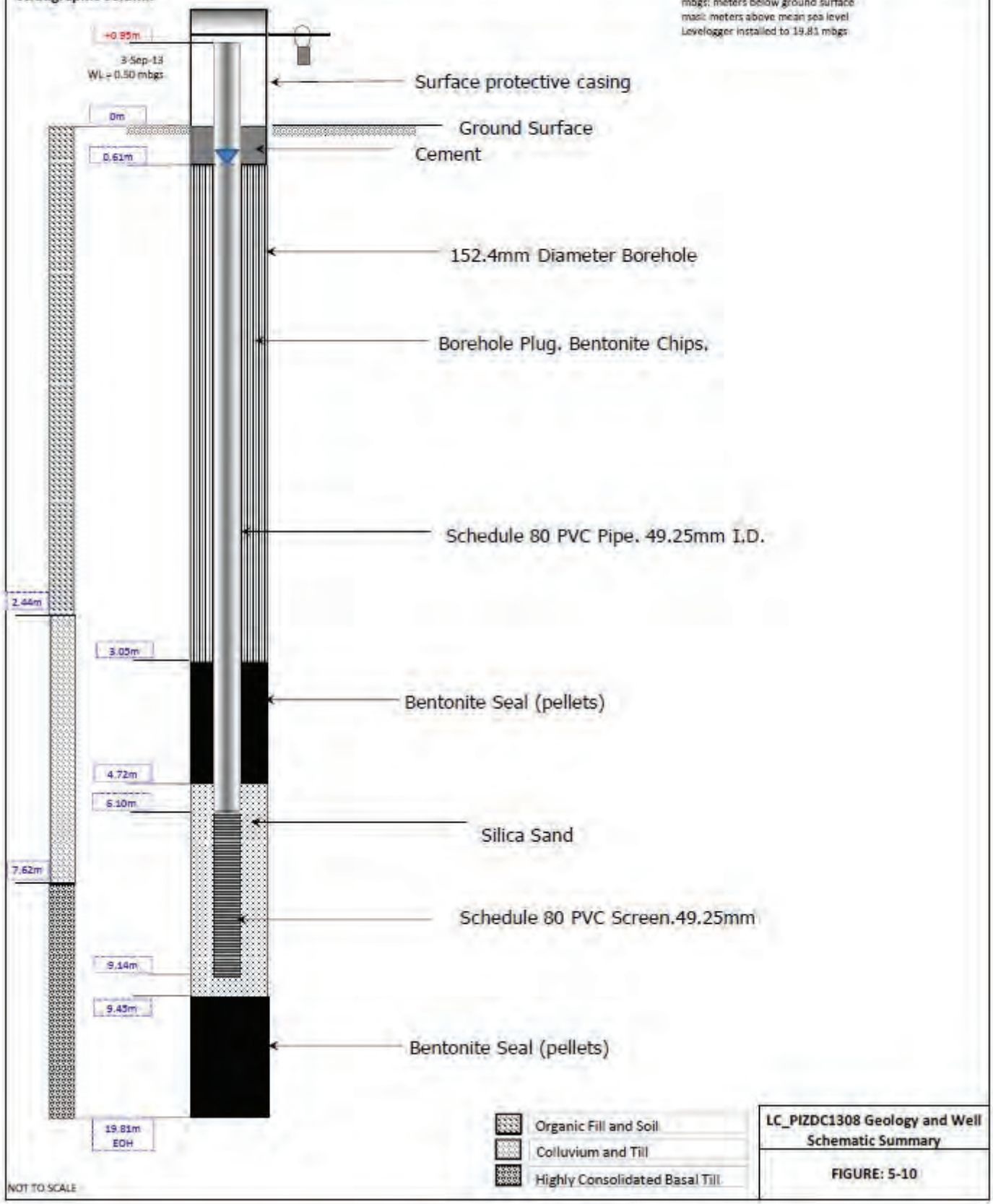
LC_PIZDC1307 Geology and Well Schematic Summary

FIGURE: 5-9

MONITORING WELL
Borehole: LC_PIZDC1308 **Location:** 5541232.170N, 658167.863E 1690.424 masl
LC_MW13-1S
DRY CREEK PROJECT - 13-1345-0010

Stratigraphic Column

Installation Date: Aug 24, 2013
mbgs: meters below ground surface
masl: meters above mean sea level
Levelogger installed to 19.81 mbgs



NOT TO SCALE

LC_PIZDC1308 Geology and Well Schematic Summary

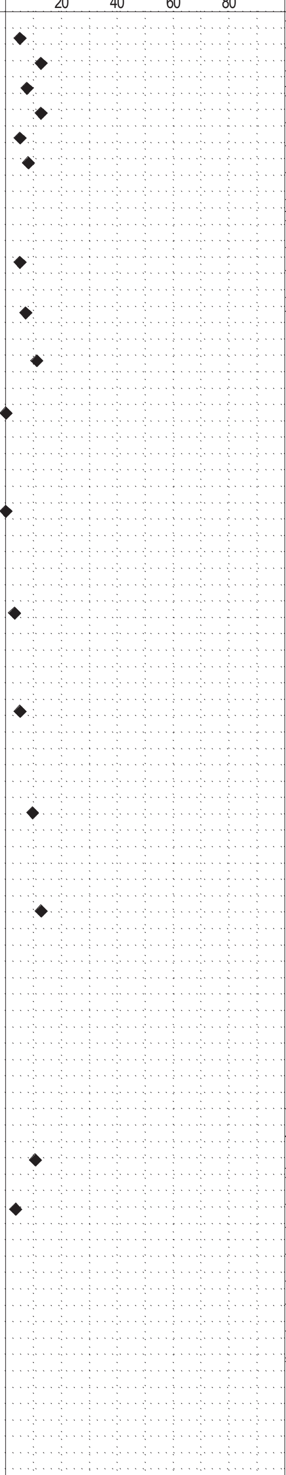
FIGURE: 5-10

CLIENT: Teck Coal Ltd.	PROJECT: GW Assessment - Effluent Ponds	BOREHOLE NO: **MW11(P)-01**
DRILLER: JR Drilling	LOCATION: Teck - LCO	PROJECT NO: BX06169
DRILL/METHOD: DR-12/ Air Rotary	BOREHOLE LOCATION: Refer to site plan	ELEVATION: 1266.06 m

SAMPLE TYPE: Shelby Tube, No Recovery, SPT Test (N), Grab Sample, Split-Pen, Core

BACKFILL TYPE: Bentonite, Pea Gravel, Slough, Grout, Drill Cuttings, Sand

Columns: Depth (m) | ◆ GASTECH VAPOUR ◆ 200 400 600 800 / ■ STANDARD PEN (N) ■ 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80 | SOIL SYMBOL | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE NO | SPT (N) | WELL INSTALLATION | OTHER TESTS COMMENTS | ELEVATION (m)



Depth (m)	SOIL DESCRIPTION	SAMPLE NO	OTHER TESTS COMMENTS
0 – 2.3	**SAND**, silty, some gravel, trace clay, loose, compact, medium brown, dry -gravelly	1, 2, 3	Top of casing (TOC) elevation is 1267.06 mASL. Stick-up = 1.0 m.
2.3 – 6.1	**SILT**, sandy, some cobbles, some gravel, compact, grey brown, damp	4, 5, 6	
6.1 – 9.1	**SILTY SAND**, some gravel, compact, medium brown, dry	7	
9.1 – 33.5	**SILT** , some cobbles, trace FG sand, firm, medium brown, damp -damp -dry -damp	8, 9, 10, 11, 12, 13, 14, 15	Depth to groundwater was 30.81 m from TOC 23 November 2011 (1236.25 mASL). 150 mm steel casing installed from surface to 33.5 m.
33.5 – 35.3	**SAND AND GRAVEL**, dense, brown grey, moist (sub-rounded gravel)	16	
35.3 – 41.2	**CG SAND**, some gravel, dense, brown grey, wet (sub rounded to sub angular) -wet	17	A 50 mm Schedule 40 slotted PVC screen was installed from 37.5 m to 40.5 m. K = 7.4 x 10^{-4}m/s
41.2	**END OF HOLE AT 41.2 m** Borehole wet at completion. Monitoring well installed.		

Depth scale: 0–45 m. Elevation scale: 1265–1222 m.

BX06169 - BOREHOLE LOGS - SEPTEMBER 30,2011.GPJ 12/01/04 03:30 PM (BOREHOLE LOG)

amec — AMEC Environment & Infrastructure, Medicine Hat, Alberta	LOGGED BY: RH	COMPLETION DEPTH: 40.50 m
	REVIEWED BY: LH	COMPLETION DATE: 11/15/11

srk consulting

Teck

HOLE ID:	MW-1	COORDINATES:	667969 E 5487521 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1500.44
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1463.25
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	37.19
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.85
BORING DATE:	8/12/2015 to 8/13/2015	CASING STICKUP (magl):	0.85

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
0	Gravel and sand (GM); Some silt. Very dark brown, well graded, moist, sub-rounded, non-plastic, non-cohesive.	
2	Gravel (GW); Sandy, trace silt. Grayish brown, well graded, dry, sub-angular, non-plastic, non-cohesive.	Very fast drilling (through sand)
4	Gravel and sand (GM); Some silt. Very dark grayish brown, well graded, moist, rounded, non-plastic, non-cohesive.	
6	Silt and sand (ML); Gravelly. Very dark grayish brown, well graded, wet, sub-rounded, non-plastic, cohesive.	Hit very wet material, holding for 20 - 30 minutes to determine SWL
8	Clay (CH); Trace sand. Very dark grayish brown, wet, high-plasticity, cohesive.	Very wet, firm clay on drillbit at end of first run
10		Second run just wet clay (added about 50% of the water observed)
12		

14-Aug-15

14-Aug-15

srk consulting

Teck

HOLE ID:	**MW-1**	COORDINATES:	667969 E 5487521 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1500.44
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1463.25
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	37.19
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.85
BORING DATE:	8/12/2015 to 8/13/2015	CASING STICKUP (magl):	0.85

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

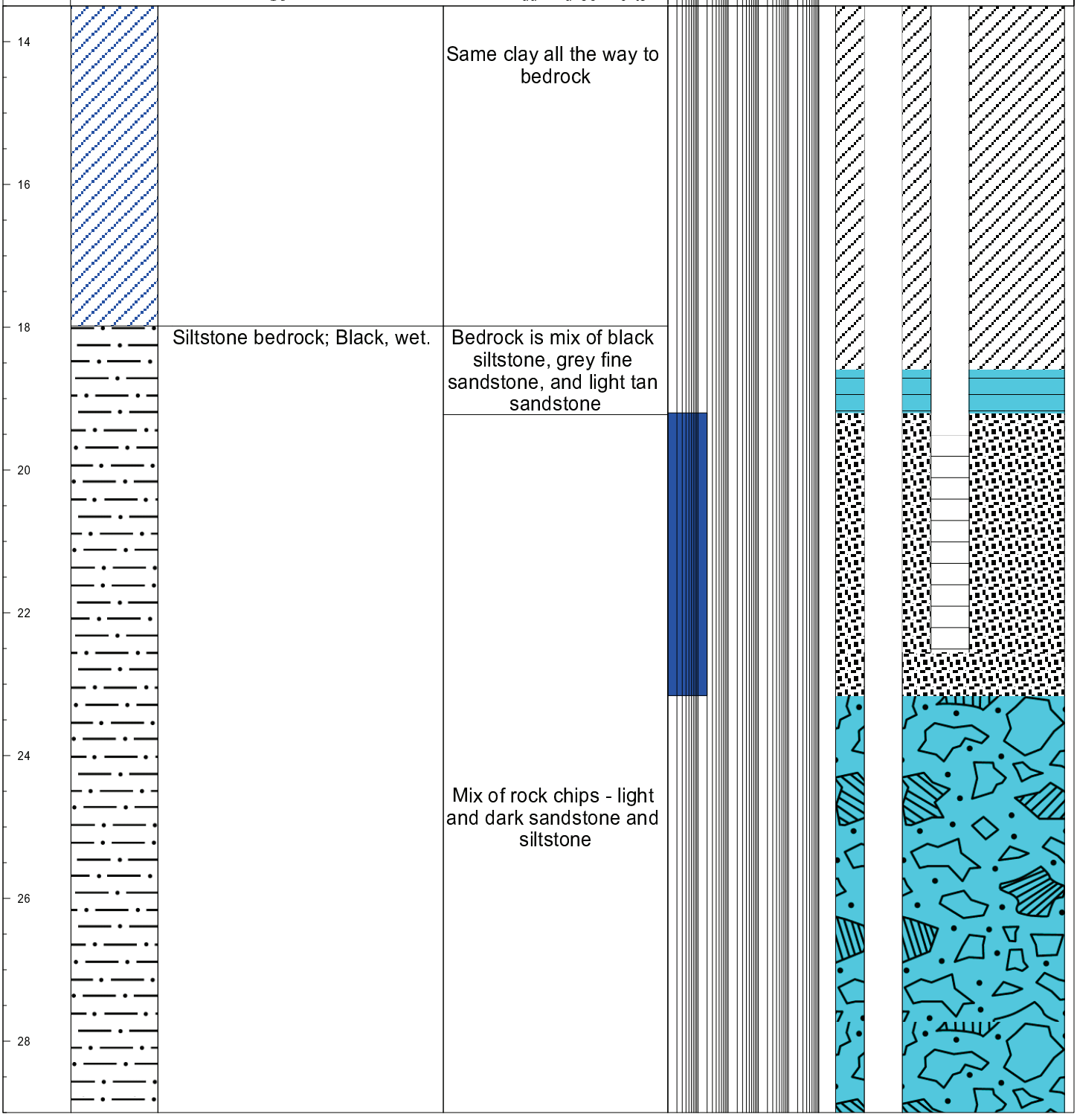
AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
14		Same clay all the way to bedrock
16		
18	Siltstone bedrock; Black, wet.	Bedrock is mix of black siltstone, grey fine sandstone, and light tan sandstone
20		
22		
24		Mix of rock chips - light and dark sandstone and siltstone
26		
28		



srk consulting

Teck

HOLE ID:	**MW-1**	COORDINATES:	667969 E 5487521 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1500.44
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1463.25
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	37.19
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.85
BORING DATE:	8/12/2015 to 8/13/2015	CASING STICKUP (magl):	0.85

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

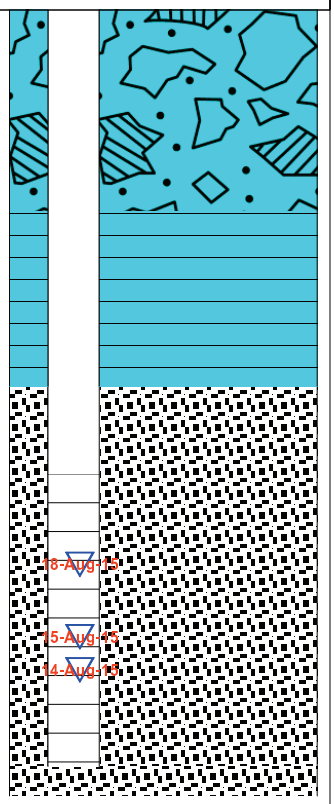
AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
30	Siltstone bedrock; Silty. Black, wet.	Layer of clayey bedrock at approximately 29.3 m
	Siltstone bedrock; Black, dry.	Switch to gray sandstone, dry
32		
34		
		Intermittent dusty zones for last 3 m
36		
		Finished drilling to target potentially wet area
38		



BRITISH COLUMBIA

Report 1 - Detailed Well Record

RG_01-03 (Elkford Supply Well)

Well Tag Number: 42698	Construction Date: 1979-07-01 00:00:00
Owner: VILLAGE OF ELKFORD	Driller: Well Identification Plate Number: Plate Attached By:
Address: BOIVIN CK & ELK RIVER	Where Plate Attached:
Area:	PRODUCTION DATA AT TIME OF DRILLING: Well Yield: 0 (Driller's Estimate)
WELL LOCATION: Land District District Lot: 12378 Plan: Lot: Township: Section: Range: Indian Reserve: Meridian: Block: Quarter: Island: BCGS Number (NAD 83): Well: 5	Development Method: Pump Test Info Flag: Y Artesian Flow: Artesian Pressure (ft): Static Level:
Class of Well: Subclass of Well: Orientation of Well: Status of Well: New Well Use: Observation Well Number: Observation Well Status: Construction Method: Diameter: 0.0 inches Casing drive shoe: Well Depth: 0 feet Elevation: 0 feet (ASL) Final Casing Stick Up: inches Well Cap Type: Bedrock Depth: feet Lithology Info Flag: File Info Flag: Sieve Info Flag: Screen Info Flag:	WATER QUALITY: Character: Colour: Odour: Well Disinfected: N EMS ID: Water Chemistry Info Flag: Y Field Chemistry Info Flag: Site Info (SEAM): Water Utility: Water Supply System Name: Water Supply System Well Name: SURFACE SEAL: Flag: Material: Method: Depth (ft): Thickness (in):
Site Info Details: Other Info Flag: Other Info Details:	WELL CLOSURE INFORMATION: Reason For Closure: Method of Closure: Closure Sealant Material: Closure Backfill Material: Details of Closure:

Screen from	to feet	Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe

GENERAL REMARKS:
YIELD:NO DATA EXPLORATORY & WATER WELL

LITHOLOGY INFORMATION:

From	0 to	0 Ft.	MEASURED IN METERS
From	0 to	12.2 Ft.	DRY MED. FINE SAND SOME SILT TRACE OF
From	0 to	0 Ft.	GRAVEL.

From	12.2	to	18.3	Ft. DRY GRAVEL SOME SILT & TRACE OF SAND.
From	0	to	0	Ft. GRAVEL WELL ROUNDED TO @ 1.5cm
From	18.3	to	21.3	Ft. DRY GRAVEL SOME BOULDERS & SILT,TRACE
From	0	to	0	Ft. OF SAND.
From	21.3	to	22.9	Ft. SANDY GRAVEL SOME SILT & CLAY
From	22.9	to	33.5	Ft. DRY GRAVEL,SOME SAND,TRACE OF SILT &
From	0	to	0	Ft. BROWN CLAY.
From	33.5	to	47.2	Ft. MOIST STICKY GRAVEL,SOME SAND,TRACE OF
From	0	to	0	Ft. SILT & CLAY.
From	47.2	to	48.8	Ft. BOULDER,PREDOMINANTLY SHALE
From	48.8	to	57.3	Ft. GRAVEL SOME SAND,TRACE OF SILT,SUB-
From	0	to	0	Ft. -ROUNDED PEBBLES TO @ 2cm.
From	57.3	to	67.1	Ft. SANDY GRAVEL WITH SOME COBBLES & TRACE
From	0	to	0	Ft. OF SILT.SAND IS MOSTLY COARSE.GRAVEL
From	0	to	0	Ft. FROM FINE TO COARSE.
From	67.1	to	70.7	Ft. SANDY GRAVEL & TRACE OF SILT.ABUNDENT
From	0	to	0	Ft. MUD & FINE SAND.
From	70.7	to	77.4	Ft. SANDY GRAVEL WITH SOME COBBLES & TRACE
From	0	to	0	Ft. OF SILT.
From	77.4	to	79.3	Ft. SANDY GRAVEL WITH SOME FINE SAND & SILT
From	79.3	to	81.4	Ft. SANDY GRAVEL WITH SOME COBBLES & TRACE
From	0	to	0	Ft. OF SILT.
From	81.4	to	84.4	Ft. SANDY GRAVEL WITH TRACE COBBLES & SILT.
From	0	to	0	Ft. SUBROUNDED GRAVEL 1-3 cm.
From	84.4	to	89.3	Ft. FINE SANDY GRAVEL TRACE COBBLES & SILT
From	90.5	to	91.7	Ft. SILTY SAND WITH SOME GRAVEL & COBBLES

- Return to Main
- Return to Search Options
- Return to Search Criteria

BRITISH COLUMBIA

Report 1 - Detailed Well Record

RG_DW-01-07

Well Tag Number: 55014

Owner: JOE SMITHIES

Address: 5 M BEFORE

Area: ELKFORD

WELL LOCATION:
KOOTENAY Land District
District Lot: 7995 Plan: 13618 Lot: 3
Township: Section: Range:
Indian Reserve: Meridian: Block:
Quarter:
Island:
BCGS Number (NAD 83): 082G096144 Well: 1

Class of Well:
Subclass of Well:
Orientation of Well:
Status of Well: New
Well Use: Private Domestic
Observation Well Number:
Observation Well Status:
Construction Method: Drilled
Diameter: 6.0 inches
Casing drive shoe:
Well Depth: 32 feet
Elevation: 0 feet (ASL)
Final Casing Stick Up: inches
Well Cap Type:
Bedrock Depth: feet
Lithology Info Flag:
File Info Flag:
Sieve Info Flag:
Screen Info Flag:

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date: 1985-07-22 00:00:00.0

Driller: Owen's Drilling Ltd.
Well Identification Plate Number:
Plate Attached By:
Where Plate Attached:

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: 2.5 (Driller's Estimate) Gallons per Minute (U.S./Imperial)
Development Method:
Pump Test Info Flag:
Artesian Flow:
Artesian Pressure (ft):
Static Level: 22 feet

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag:
Field Chemistry Info Flag:
Site Info (SEAM):

Water Utility:
Water Supply System Name:
Water Supply System Well Name:

SURFACE SEAL:
Flag:
Material:
Method:
Depth (ft): 0 feet
Thickness (in):
Liner from To: feet

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size
0	0		0
0	0		0
0	0		0
0	0		0

Casing from	to feet	Diameter	Material	Drive Shoe
0	0	0	null	null

GENERAL REMARKS:

LITHOLOGY INFORMATION:

From	0 to	31 Ft.	sandy gravel and clay wet
From	31 to	32 Ft.	sandy gravel

- Return to Main
- Return to Search Options
- Return to Search Criteria

BRITISH COLUMBIA

Report 1 - Detailed Well Record

RG_DW-02-20

Well Tag Number: 101942

Owner: ELK VALLEY FLYING CLUB

Address:

Area:

WELL LOCATION:
KOOTENAY Land District
District Lot: 4144 Plan: Lot:
Township: Section: Range:
Indian Reserve: Meridian: Block:
Quarter:
Island:
BCGS Number (NAD 27): 082G086231 Well: 4

Class of Well: Water supply
Subclass of Well: Domestic
Orientation of Well: Vertical
Status of Well: New
Well Use: Private Domestic
Observation Well Number:
Observation Well Status:
Construction Method:
Diameter: inches
Casing drive shoe: Y
Well Depth: 60 feet
Elevation: feet (ASL)
Final Casing Stick Up: inches
Well Cap Type:
Bedrock Depth: feet
Lithology Info Flag: N
File Info Flag: N
Sieve Info Flag: N
Screen Info Flag: N

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date: 2002-04-02 00:00:00

Driller: J. R. Drilling
Well Identification Plate Number:
Plate Attached By:
Where Plate Attached:

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: 60 (Driller's Estimate) U.S. Gallons per Minute
Development Method: Air lifting
Pump Test Info Flag: N
Artesian Flow:
Artesian Pressure (ft):
Static Level: 7 feet

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag: N
Field Chemistry Info Flag:
Site Info (SEAM):

Water Utility:
Water Supply System Name:
Water Supply System Well Name:

SURFACE SEAL:
Flag: N
Material:
Method:
Depth (ft):
Thickness (in):
Liner from To: feet

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe
0	60	6	Steel	Y

GENERAL REMARKS:
MEASUREMENTS: TOP OF CASING. PITLESS UNIT: WELDED. SHOE: BARBER. WATER QUALITY AND QUANTITY NOT GUARANTEED BY CONTRACTOR.

LITHOLOGY INFORMATION:

From	0 to	47 Ft.	gravel
From	47 to	52 Ft.	clay
From	52 to	60 Ft.	gravel

- Return to Main
- Return to Search Options
- Return to Search Criteria

BRITISH COLUMBIA

Report 1 - Detailed Well Record

RG_DW-03-01

Well Tag Number: 94779

Owner: SPARDELL MOBILE HOME PARK LTD

Address: 100 INDUSTRIAL ROAD #1

Area: SPARWOOD

WELL LOCATION:
KOOTENAY Land District
District Lot: 4588 Plan: 1358 & NEP 64776 Lot: 13 & 1
Township: Section: Range:
Indian Reserve: Meridian: Block:
Quarter:
Island:
BCGS Number (NAD 83): 082G076233 Well: 9

Class of Well: Water supply
Subclass of Well: Domestic
Orientation of Well: Vertical
Status of Well: New
Licence General Status: UNLICENSED
Well Use: Water Supply System
Observation Well Number:
Observation Well Status:
Construction Method:
Diameter: inches
Casing drive shoe: Y
Well Depth: 50 feet
Elevation: 3697 feet (ASL)
Final Casing Stick Up: 12 inches
Well Cap Type: BOLT ON
Bedrock Depth: feet
Lithology Info Flag: Y
File Info Flag: N
Sieve Info Flag: N
Screen Info Flag: Y

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date: 2008-02-28 00:00:00

Driller: Owen's Drilling Ltd.
Well Identification Plate Number: 26287
Plate Attached By: MIKE CALDWELL
Where Plate Attached: TOP OF CASING

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: 30 (Driller's Estimate) U.S. Gallons per Minute
Development Method: Air lifting
Pump Test Info Flag: N
Artesian Flow:
Artesian Pressure (ft):
Static Level:

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag: N
Field Chemistry Info Flag:
Site Info (SEAM):

Water Utility:
Water Supply System Name:
Water Supply System Well Name:

SURFACE SEAL:
Flag: Y
Material: Bentonite clay
Method: Poured
Depth (ft): 15 feet
Thickness (in): 2 inches
Liner from To: feet

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size
46	50		30

Casing from	to feet	Diameter	Material	Drive Shoe
0	46	6	Steel	Y

GENERAL REMARKS:

LITHOLOGY INFORMATION:

From 0 to 15 Ft. Medium CLAY & TOP SOIL brown

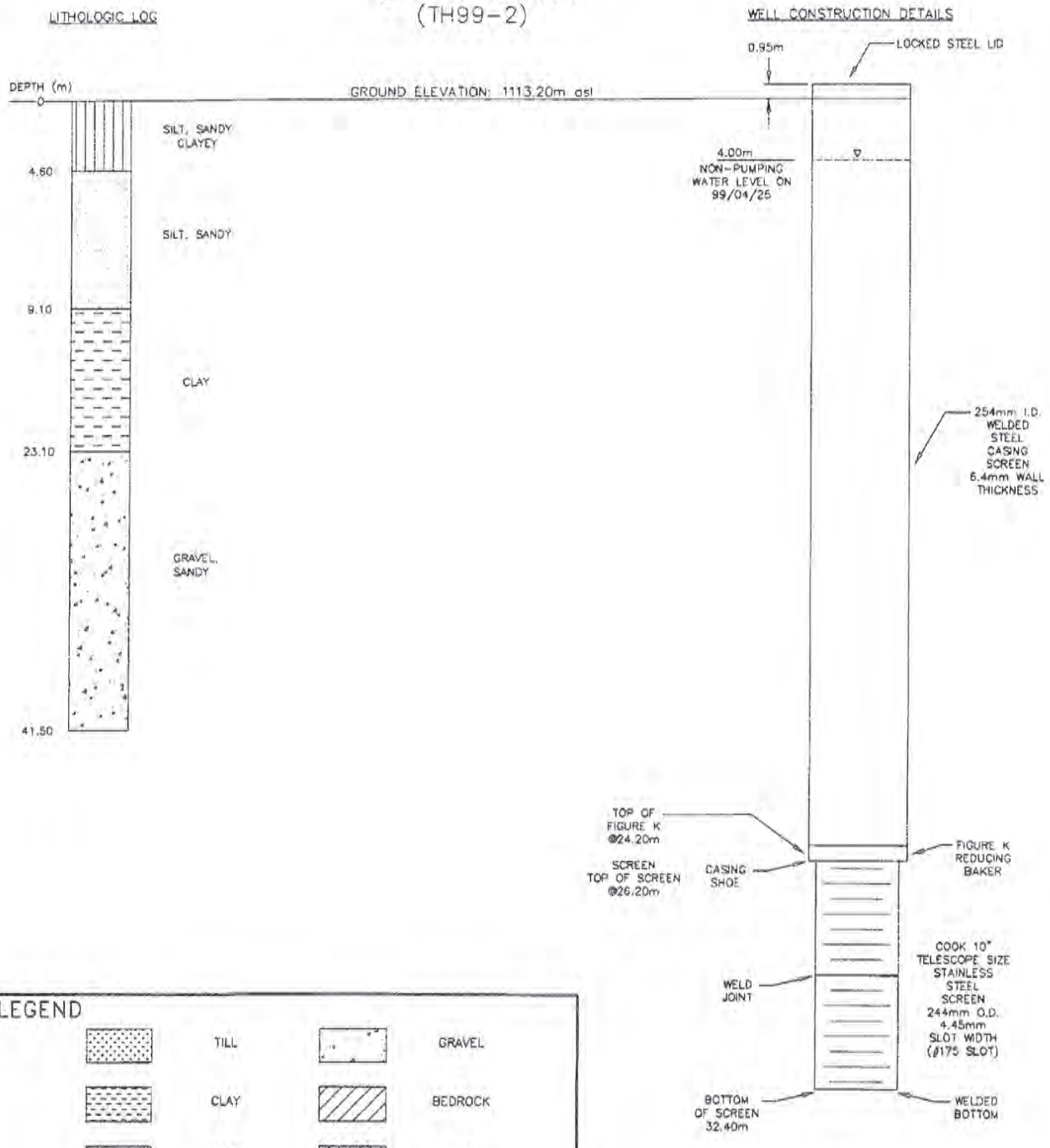
From 15 to 30 Ft. Medium brown

From 30 to 45 Ft. Medium CLAY & GRAVEL brown

From 45 to 50 Ft. Medium 30 U.S. Gallons per Minute brown

- Return to Main
- Return to Search Options
- Return to Search Criteria

TEST PRODUCTION (TH99-2)



LEGEND

	TILL		GRAVEL
	CLAY		BEDROCK
	SAND		SILT

RIG TYPE: BARBER AIR ROTARY
DRILLING CONTRACTOR: JR DRILLING, CRANBROOK, BC
PUMPING TEST CONTRACTOR: MOORE'S WELL & PUMP SERVICE, VERNON, BC
DATE OF COMPLETION: 22 APRIL 1999

NOT TO SCALE

uma

HYDROGEOLOGICAL EVALUATION OF A NEW TEST WELL
DISTRICT OF SPARWOOD, BC

FIG. 3

JOB# 0764-206-00-02

Appendix IV

Field Methodology

Appendix IV: Field Methodologies

Water sample collection and handling was completed by Teck or others in accordance with the 2013 edition of the British Columbia Field Sampling Manual[1] as required in Permit 107517 and Teck's Standard Practices and Procedures (SP&Ps) for well monitoring, purging, and sampling (TC_GW-01 and TC_GW-02). The appropriate well-specific methods were used to account for well construction, type, and recharge. Specific purging and sampling methodology varied by program and well type, water depth, and well recharge. Methodology also depended on well access (e.g., water supply wells that may have restricted access) or wells that warranted an alternative method due to construction (e.g., well diameter, depth, screen placement). A consistent method was used at each location despite variation between locations. SNC-Lavalin reviewed the 2018 SSGMPs for each operation (Golder, 2019; SRK, 2019; SNC-Lavalin, 2019a, b, c) and any available field sheets. Based on the BC Field Sampling Manual and Teck's SP&P for groundwater monitoring, purging, and sampling, the following was completed.

- The equipment was prepared and calibrated. If a field measurement was identified out of the expected historical ranges from previous sampling events at the monitoring well, calibration of field probes was re-confirmed.
- Prior to sample collection, manual water level measurements (i.e. with a water level tape) were measured from each location.
- In addition to manual monitoring, select wells were continuously monitored with data loggers.
- Data from the loggers were downloaded each quarter when possible. Prior to sampling or deployment of pressure transducers (also referred to as dataloggers) depth-to-water measurements were collected. Manual and data logger measurements were collected at approximately the same time of day to avoid possible discrepancies in data due to daily fluctuation of water table. Data loggers were removed and uploaded following the depth to water measurement. After samples were collected the data logger was re-deployed at the same depth. Any changes in length of cable used were noted.
- Pressure transducer data was corrected for atmospheric influences using a barometric logger which measures atmospheric pressure. Pressure transducers were deployed below water level and both pressure transducers and barometric loggers were deployed below the anticipated frost penetration depth to prevent the instrument from freezing.
- Dedicated tubing was installed in each well and a pump was used to draw water to the surface for sample collection. The specific pump type selected for each monitoring well location was determined based on well construction, type, and recharge characteristics. Wells were purged three well volumes or until field parameters (conductivity, dissolved oxygen, pH, oxidation-reduction potential (ORP), and temperature) stabilized after three consecutive readings using a YSI flow through cell. Field parameters were recorded once stable, prior to sampling.
- Following purging, samples were collected at a flow rate of approximately 0.1 L/min using the lowest possible setting for the particular pump. (The low-flow rate is intended to minimize the disturbance of entrained sediments mixing within the well and is intended to draw water directly from the formation around the well.)

[1] Clark, M.J.R. (editor). 2013. *British Columbia Field Sampling Manual.* Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection, Victoria, BC, Canada. 312 pp.

Select wells required different methods for sampling including:

- Supply and domestic wells sampled as part of the RGMP (FR_GH_WELL4, POTW09, POTW10, GH_POTW15, GH_POTW17, EV_BRgw, EV_RCgw, EV_WH50gw, EV_HW1, RG_DW-01-03, RG_DW-01-07, RG_DW-02-20, RG_DW-03-01, RG_DW-03-04, and RG_DW-07-01) were sampled using the following methods:
  - There is limited access to the wellhead at supply wells; therefore, samples were collected from a distribution point (i.e. faucet) within the water system or at the sample port at the well head. Domestic wells were sampled, where possible, via the sample port used in the initial drinking water evaluation or previous sampling event;
  - Prior to collection of samples, the tap or valve at the sample location was opened for a minimum of five minutes to purge water through the distribution system. The objective of purging was to obtain samples representative of the water source and not a sample influenced by the distribution system; and
  - Water quality parameters (pH/electrical conductivity/temperature) were monitored until stable readings were obtained. Once the stabilized water quality parameters were recorded, the flow was reduced to minimize splashing and samples were collected in laboratory supplied bottles.
- Monitoring well GH_MW-RLP-1D was sampled in Q3 and Q4 using a Hydrasleeve™ (i.e., no purge) due to the depth of the monitoring well (82.5 m bgs); and,
- Monitoring well CM_MW1-DP was sampled using a Hydrasleeve™ (no purge method) due to the well (>30 mbgs).
- At FRO, wells with depth to water less than 7 m below ground surface (bgs) were purged and sampled following low-flow (0.5 L/min) sampling techniques to minimize sediment entrainment. In cases where depth to water was approximately 7 m bgs or greater, wells were sampled using Waterra tubing fitted with a foot valve.

Monitoring wells with continuous water level data for at least one quarter in 2018 are listed in Table IV-1 below:

Table IV-1: Summary of Monitoring Wells with Data Loggers

Operation	Monitoring Wells
FRO	FR_HMW5
GHO	GH_MW-PC, GH_MW-RLP-1D, GH_GA-MW-1, GH_GA-MW-2, GH_GA-MW-3, and GH_GA-MW-4
LCO	LC_PIZDC1307, LC_PIZDC1308, and PIZP1101
EVO	EV_GV3gw, EV_LSgw, EV_OCgw, EV_MCgwS, EV_MCgwD, EV_BCgw, EV_ER1gwS and EV_ECgw

Sampling Frequency

Permit 107517 prescribes a minimum quarterly sampling frequency; therefore, the monitoring schedule and rationale was as follows:

- Winter (Q1): Winter sampling to capture when groundwater levels were nearing their lowest and recharge to groundwater was minimized due to frozen ground.
- Spring (Q2): Sampling during the freshet months to capture when groundwater levels and the extent of groundwater recharge and discharge were maximized.
- Summer (Q3): Sampling during the post freshet months to capture when the groundwater levels were decreasing.
- Fall (Q4): Sampling to capture groundwater conditions between the summer and winter sampling events.

Quarterly sampling was recommended for a minimum of one year after well installation to assess seasonal variability of groundwater conditions as per the BC ENV's Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators[2]. Monitoring frequency is reviewed on an annual basis to assess adequacy to address the seasonal variability and whether the frequency should be reduced if little to no variability is observed.

Analyte List

Based on the 2015 RGMP and the 2017 RGMP Updates, groundwater was analyzed for select constituents based on the core list of general water quality analytes provided in Table 2 of the BC ENV's[2] Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators and Permit 107517 Table 25. Minimum detection limits for each parameter will be suitable for comparison to the applicable standards and/or guidelines.

Analytes measured included: physical parameters (pH, hardness as CaCO3, specific conductance, TSS, TDS, turbidity, alkalinity [total as CaCO3], ammonia as N); major anions (chloride, fluoride, bromide and sulphate); nutrients (nitrate-nitrogen, nitrite-nitrogen, TKN, ortho phosphorus, total phosphorus); organics (total and dissolved organic carbon); and dissolved metals.

Analyses for dissolved metals are specified in the RGMP to prevent misrepresentation of the mobile concentrations of constituents due to increased turbidity, which may occur as a result of sampling techniques, well construction, and/or geological formation (i.e., clay or silt bearing formations). For metals, the dissolved (i.e., filtered samples) component provides the best representation of groundwater transport. Approval for removal of total metals from all of Teck's groundwater sampling programs was received via email to Teck from ENV on November 3, 2016.

[2] BC Ministry of Environment. 2016. Technical Guidance 6: Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators. Technical Guidance for Environmental Management Act Applications, Version 2.0, June 2016.

Sample Handling, Shipment, and Analysis

Samples were handled and shipped in a manner that is consistent with the practices and procedures prescribed in the British Columbia Field Sampling Manual. Samples were submitted to a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory for analysis in accordance with the British Columbia Environmental Laboratory Manual[3].

The following was completed as per Teck's SP&P:

- Preservatives and certified clean sample bottles were provided by an accredited laboratory;
- Samples collected for dissolved metals were field-filtered using an in-line filter;
- Samples that required preservation were preserved in the field, with the exception of dissolved ultra-trace mercury that was lab filtered as required by the laboratory; and
- Samples were shipped in ice-chilled coolers under chain-of-custody documentation and procedures.

[3] Austin, J. (editor). 2015. British Columbia Environmental Laboratory Manual. Environmental Monitoring, Reporting and Economics Section, Knowledge Management Branch, B.C., Ministry of Environment, Victoria, BC.

Appendix V

Laboratory Certificate of Analysis

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
P.O. Box 5000
Elkford BC V0B 1H0

Date Received: 07-MAR-18
Report Date: 23-JAN-19 14:02 (MT)
Version: FINAL REV. 2

Client Phone: 250-865-3284

Certificate of Analysis

Lab Work Order #: L2064562

Project P.O. #: VPO00540380
Job Reference: GREENHILLS OPERATION
C of C Numbers:
Legal Site Desc:

Comments:

23-JAN-2019 Revision 2: As requested, the client sample id for the sample, L2064562-1, was modified.

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2064562-1	L2064562-2	L2064562-3	L2064562-4	L2064562-5
Description	WG	WG	WG	WG	WG
Sampled Date	06-MAR-18	06-MAR-18	06-MAR-18	06-MAR-18	06-MAR-18
Sampled Time	11:07	13:18	13:40	12:45	12:45
Client ID	GH_MW-RLP-1D_WG_2018-01-01_NP	GH_POTW10_WG_2018-01-01_NP	GH_POTW15_WG_2018-01-01_NP	GH_POTW17_WG_2018-01-01_NP	GH_GWB1_WG_2018-01-01_NP
Grouping / **Analyte**					
WATER					
Physical Tests					
Conductivity (uS/cm)	405	742	936	1260	<2.0
Hardness (as CaCO3) (mg/L)	217	385	470	720	<0.50
pH (pH)	8.34	8.02	7.99	7.95	5.50
ORP (mV)	52.2	196	215	228	353
Total Suspended Solids (mg/L)	4.7	2.5	2.3	24.5	<1.0
Total Dissolved Solids (mg/L)	224	507	660	991	<3.0
Turbidity (NTU)	45.2	11.8	13.4	8.68	<0.10
Anions and Nutrients					
Acidity (as CaCO3) (mg/L)	<1.0	5.1	6.9	11.1	1.7
Alkalinity, Bicarbonate (as CaCO3) (mg/L)	211	207	232	282	<1.0
Alkalinity, Carbonate (as CaCO3) (mg/L)	5.6	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	216	207	232	282	<1.0
Ammonia, Total (as N) (mg/L)	<0.0050	0.0713	0.0407	0.0112	<0.0050
Bromide (Br) (mg/L)	<0.050	<0.050	<0.25 DLDS	<0.25 DLDS	<0.050
Chloride (Cl) (mg/L)	0.42	5.20	28.5	18.2	<0.10
Fluoride (F) (mg/L)	1.68	0.819	0.19	0.16	<0.020
Nitrate (as N) (mg/L)	<0.0050	0.591	<0.025 DLDS	0.402	<0.0050
Nitrite (as N) (mg/L)	<0.0010	0.0160	<0.0050 DLDS	<0.0050 DLDS	<0.0010
Total Kjeldahl Nitrogen (mg/L)	<0.050	0.094	0.065	0.061	<0.050
Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total (mg/L)	0.0060	0.0026	<0.0020	0.0170	<0.0020
Sulfate (SO4) (mg/L)	0.68	193	251	451	<0.30
Anion Sum (meq/L)	4.44	8.40	10.7	15.6	<0.10
Cation Sum (meq/L)	4.56	8.01	9.97	14.8	<0.10
Cation - Anion Balance (%)	1.4	-2.4	-3.5	-2.6	0.0
Organic / Inorganic Carbon					
Dissolved Organic Carbon (mg/L)	2.65	0.64	0.99	1.03	<0.50
Total Organic Carbon (mg/L)	3.03	0.60	1.08	0.93	<0.50
Total Metals					
Aluminum (Al)-Total (mg/L)		<0.0030	<0.0030	0.0727	<0.0030
Antimony (Sb)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total (mg/L)		0.00132	0.00168	0.00036	<0.00010
Barium (Ba)-Total (mg/L)		0.0191	0.0228	0.0309	<0.000050
Beryllium (Be)-Total (ug/L)		<0.020	<0.020	<0.020	<0.020
Bismuth (Bi)-Total (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total (mg/L)		0.037	0.021	0.021	<0.010
Cadmium (Cd)-Total (ug/L)		0.0062	0.0128	0.0736	<0.0050
Calcium (Ca)-Total (mg/L)		96.1	135	183	<0.050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2064562-6				
	Description	WG				
	Sampled Date	06-MAR-18				
	Sampled Time	12:45				
	Client ID	GH_GWD1_WG_2018-01-01_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	1280				
	Hardness (as CaCO3) (mg/L)	708				
	pH (pH)	7.89				
	ORP (mV)	244				
	Total Suspended Solids (mg/L)	15.5				
	Total Dissolved Solids (mg/L)	987				
	Turbidity (NTU)	15.8				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	7.9				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	286				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	286				
	Ammonia, Total (as N) (mg/L)	0.0177				
	Bromide (Br) (mg/L)	<0.25 DLDS				
	Chloride (Cl) (mg/L)	18.1				
	Fluoride (F) (mg/L)	0.15				
	Nitrate (as N) (mg/L)	0.377				
	Nitrite (as N) (mg/L)	<0.0050 DLDS				
	Total Kjeldahl Nitrogen (mg/L)	0.053				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	0.0130				
	Sulfate (SO4) (mg/L)	447				
	Anion Sum (meq/L)	15.6				
	Cation Sum (meq/L)	14.6				
	Cation - Anion Balance (%)	-3.3				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.90				
	Total Organic Carbon (mg/L)	1.31				
Total Metals	Aluminum (Al)-Total (mg/L)	0.0883				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00038				
	Barium (Ba)-Total (mg/L)	0.0310				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.023				
	Cadmium (Cd)-Total (ug/L)	0.0589				
	Calcium (Ca)-Total (mg/L)	186				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2064562-1 WG 06-MAR-18 11:07 GH_MW-RLP-1D_WG_2018-01-01_NP	L2064562-2 WG 06-MAR-18 13:18 GH_POTW10_WG_2018-01-01_NP	L2064562-3 WG 06-MAR-18 13:40 GH_POTW15_WG_2018-01-01_NP	L2064562-4 WG 06-MAR-18 12:45 GH_POTW17_WG_2018-01-01_NP	L2064562-5 WG 06-MAR-18 12:45 GH_GWB1_WG_2018-01-01_NP
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)		<0.00010	<0.00010	0.00088	<0.00010
	Cobalt (Co)-Total (ug/L)		0.18	0.27	0.25	<0.10
	Copper (Cu)-Total (mg/L)		<0.00050	0.0184	0.0256	<0.00050
	Iron (Fe)-Total (mg/L)		0.896	1.13	1.06	0.024 RRV
	Lead (Pb)-Total (mg/L)		0.000069	0.00151	0.00571	<0.000050
	Lithium (Li)-Total (mg/L)		0.0174	0.0158	0.0126	<0.0010
	Magnesium (Mg)-Total (mg/L)		42.6	44.3	72.0	<0.10
	Manganese (Mn)-Total (mg/L)		0.0554	0.200	0.0871	0.00033 RRV
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.00278	0.00239	0.00110	<0.000050
	Nickel (Ni)-Total (mg/L)		0.0131	0.0309	0.112	0.00068 RRV
	Potassium (K)-Total (mg/L)		1.67	1.52	1.61	<0.050
	Selenium (Se)-Total (ug/L)		4.56	0.110	8.61	<0.050
	Silicon (Si)-Total (mg/L)		4.81	4.37	4.61	<0.10
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		5.20	11.4	7.90	<0.050
	Strontium (Sr)-Total (mg/L)		0.500	0.366	0.440	<0.00020
	Thallium (Tl)-Total (mg/L)		<0.000010	0.000016	0.000020	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	0.00077	0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000706	0.00133	0.00235	<0.000010
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050	0.00053	<0.00050
	Zinc (Zn)-Total (mg/L)		<0.0030	0.0146	0.0204	<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0053	<0.0030	0.0033	<0.0030	<0.0030
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00015	0.00123	0.00169	0.00014	<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.0496	0.0193	0.0225	0.0274	<0.000050
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	0.015	0.034	0.019	0.024	<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	0.0083	0.0249 DTMF	0.0509	<0.0050
	Calcium (Ca)-Dissolved (mg/L)	40.0	86.9	118	172	<0.050
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00011	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10	0.16	0.25	0.14	<0.10
	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2064562-6				
	Description	WG				
	Sampled Date	06-MAR-18				
	Sampled Time	12:45				
	Client ID	GH_GWD1_WG_2018-01-01_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00040 DLB				
	Cobalt (Co)-Total (ug/L)	0.25				
	Copper (Cu)-Total (mg/L)	0.0452				
	Iron (Fe)-Total (mg/L)	0.656				
	Lead (Pb)-Total (mg/L)	0.00520				
	Lithium (Li)-Total (mg/L)	0.0128				
	Magnesium (Mg)-Total (mg/L)	68.7				
	Manganese (Mn)-Total (mg/L)	0.0962				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00105				
	Nickel (Ni)-Total (mg/L)	0.0913				
	Potassium (K)-Total (mg/L)	1.65				
	Selenium (Se)-Total (ug/L)	6.41				
	Silicon (Si)-Total (mg/L)	4.71				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	7.89				
	Strontium (Sr)-Total (mg/L)	0.461				
	Thallium (Tl)-Total (mg/L)	0.000019				
	Tin (Sn)-Total (mg/L)	0.00020				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00218				
	Vanadium (V)-Total (mg/L)	0.00054				
	Zinc (Zn)-Total (mg/L)	0.0341				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	0.00015				
	Barium (Ba)-Dissolved (mg/L)	0.0281				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.023				
	Cadmium (Cd)-Dissolved (ug/L)	0.0444				
	Calcium (Ca)-Dissolved (mg/L)	166				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (ug/L)	0.14				
	Copper (Cu)-Dissolved (mg/L)	<0.00050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2064562-1	L2064562-2	L2064562-3	L2064562-4	L2064562-5
	Description	WG	WG	WG	WG	WG
	Sampled Date	06-MAR-18	06-MAR-18	06-MAR-18	06-MAR-18	06-MAR-18
	Sampled Time	11:07	13:18	13:40	12:45	12:45
	Client ID	GH_MW-RLP-1D_WG_2018-01-01_NP	GH_POTW10_WG_2018-01-01_NP	GH_POTW15_WG_2018-01-01_NP	GH_POTW17_WG_2018-01-01_NP	GH_GWB1_WG_2018-01-01_NP
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	0.034	0.785	0.808	0.155	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000206	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0062	0.0142	0.0131	0.0128	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	28.3	40.9	42.7	70.6	<0.10
	Manganese (Mn)-Dissolved (mg/L)	0.00195	0.0519	0.197	0.0762	0.00015 RRV
	Mercury (Hg)-Dissolved (mg/L)	<0.000050 DLM	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000132	0.00251	0.00212	0.000969	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00159	0.00114	0.0128	<0.00050
	Potassium (K)-Dissolved (mg/L)	1.30	1.71	1.58	1.72	<0.050
	Selenium (Se)-Dissolved (ug/L)	4.26	4.55	0.152	7.76	<0.050
	Silicon (Si)-Dissolved (mg/L)	4.72	4.80	4.24	4.56	<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	4.65	5.09	11.4	8.18	<0.050
	Strontium (Sr)-Dissolved (mg/L)	0.186	0.509	0.367	0.493	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	0.000017	0.000013	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	<0.000010	0.000654	0.00130	0.00207	<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2064562-6				
	Description	WG				
	Sampled Date	06-MAR-18				
	Sampled Time	12:45				
	Client ID	GH_GWD1_WG_2018-01-01_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	0.128				
	Lead (Pb)-Dissolved (mg/L)	0.000138				
	Lithium (Li)-Dissolved (mg/L)	0.0125				
	Magnesium (Mg)-Dissolved (mg/L)	71.1				
	Manganese (Mn)-Dissolved (mg/L)	0.0769				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00100				
	Nickel (Ni)-Dissolved (mg/L)	0.0131				
	Potassium (K)-Dissolved (mg/L)	1.75				
	Selenium (Se)-Dissolved (ug/L)	7.96				
	Silicon (Si)-Dissolved (mg/L)	4.61				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	8.45				
	Strontium (Sr)-Dissolved (mg/L)	0.500				
	Thallium (Tl)-Dissolved (mg/L)	0.000013				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00210				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	<0.0030				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Chromium (Cr)-Dissolved	MB-LOR	L2064562-5
Method Blank	Chromium (Cr)-Total	MB-LOR	L2064562-2, -3, -4, -5, -6
Matrix Spike	Fluoride (F)	MS-B	L2064562-1, -2, -3, -4, -5, -6
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2064562-1, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2064562-1, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2064562-5
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L2064562-5
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L2064562-5
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2064562-1, -2, -3, -4, -5, -6
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2064562-5
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2064562-1, -2, -3, -4, -5, -6
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2064562-5
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L2064562-5
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2064562-5
Matrix Spike	Selenium (Se)-Dissolved	MS-B	L2064562-5
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2064562-1, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2064562-5
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2064562-1, -2, -3, -4, -5, -6
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2064562-5
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2064562-5
Matrix Spike	Barium (Ba)-Total	MS-B	L2064562-2, -3, -4, -5, -6
Matrix Spike	Barium (Ba)-Total	MS-B	L2064562-5
Matrix Spike	Calcium (Ca)-Total	MS-B	L2064562-2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Total	MS-B	L2064562-5
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2064562-2, -3, -4, -5, -6
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2064562-5
Matrix Spike	Manganese (Mn)-Total	MS-B	L2064562-2, -3, -4, -5, -6
Matrix Spike	Manganese (Mn)-Total	MS-B	L2064562-5
Matrix Spike	Potassium (K)-Total	MS-B	L2064562-2, -3, -4, -5, -6
Matrix Spike	Silicon (Si)-Total	MS-B	L2064562-2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Total	MS-B	L2064562-2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Total	MS-B	L2064562-5
Matrix Spike	Strontium (Sr)-Total	MS-B	L2064562-2, -3, -4, -5, -6
Matrix Spike	Strontium (Sr)-Total	MS-B	L2064562-5
Matrix Spike	Phosphorus (P)-Total	MS-B	L2064562-1, -2, -3, -4, -5, -6
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2064562-1, -2, -3, -4, -5, -6

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified

Reference Information

endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA Water Alkalinity Species by Titration APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA Water Diss. Be (low) in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA Water Total Be (Low) in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA Water Bromide in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA Water Dissolved organic carbon by combustion APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA Water Total organic carbon by combustion APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA Water Chloride in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Reference Information

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Reference Information

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TECK COAL LIMITED (GREENHILLS)
P.O. Box 5000
Elkford BC V0B 1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R3979555								
WG2728678-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			108.3		%		85-115	08-MAR-18
WG2728678-1 MB								
Acidity (as CaCO3)			1.8		mg/L		2	08-MAR-18
Batch R3984378								
WG2729856-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			108.4		%		85-115	12-MAR-18
WG2729856-1 MB								
Acidity (as CaCO3)			<1.0		mg/L		2	12-MAR-18
Batch R3984764								
WG2731227-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			108.0		%		85-115	13-MAR-18
WG2731227-1 MB								
Acidity (as CaCO3)			1.6		mg/L		2	13-MAR-18
ALK-TITR-VA	**Water**							
Batch R3979548								
WG2728700-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			100.1		%		85-115	08-MAR-18
WG2728700-5 DUP		**L2064562-1**						
Alkalinity, Total (as CaCO3)		216	214		mg/L	0.9	20	08-MAR-18
WG2728700-1 MB								
Alkalinity, Total (as CaCO3)			1.0		mg/L		1	08-MAR-18
BE-D-L-CCMS-VA	**Water**							
Batch R3984972								
WG2730193-2 LCS								
Beryllium (Be)-Dissolved			97.3		%		80-120	13-MAR-18
WG2730193-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	13-MAR-18
BE-T-L-CCMS-VA	**Water**							
Batch R3984572								
WG2730525-2 LCS								
Beryllium (Be)-Total			105.2		%		80-120	13-MAR-18
WG2730525-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	13-MAR-18
BR-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-VA	**Water**							
Batch R3984647								
WG2728681-2 LCS								
Bromide (Br)			98.0		%		85-115	08-MAR-18
WG2728681-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	08-MAR-18
WG2728681-4 MS		**L2064562-1**						
Bromide (Br)			97.5		%		75-125	08-MAR-18
CARBONS-DOC-VA	**Water**							
Batch R3979025								
WG2728657-12 LCS								
Dissolved Organic Carbon			101.6		%		80-120	08-MAR-18
WG2728657-4 LCS								
Dissolved Organic Carbon			99.8		%		80-120	08-MAR-18
WG2728657-8 LCS								
Dissolved Organic Carbon			101.8		%		80-120	08-MAR-18
WG2728657-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	08-MAR-18
WG2728657-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	08-MAR-18
WG2728657-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	08-MAR-18
CARBONS-TOC-VA	**Water**							
Batch R3979023								
WG2728656-1 LCS								
Total Organic Carbon			99.9		%		80-120	08-MAR-18
WG2728656-13 LCS								
Total Organic Carbon			101.5		%		80-120	08-MAR-18
WG2728656-5 LCS								
Total Organic Carbon			98.9		%		80-120	08-MAR-18
WG2728656-9 LCS								
Total Organic Carbon			101.4		%		80-120	08-MAR-18
WG2728656-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	08-MAR-18
WG2728656-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	08-MAR-18
WG2728656-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	08-MAR-18
CL-L-IC-N-VA	**Water**							

Quality Control Report

Workorder: L2064562 Report Date: 23-JAN-19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-L-IC-N-VA	**Water**							
Batch R3984647								
WG2728681-2 LCS								
Chloride (Cl)			99.2		%		90-110	08-MAR-18
WG2728681-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	08-MAR-18
WG2728681-4 MS		**L2064562-1**						
Chloride (Cl)			97.9		%		75-125	08-MAR-18
EC-PCT-VA	**Water**							
Batch R3979555								
WG2728678-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			103.3		%		90-110	08-MAR-18
WG2728678-1 MB								
Conductivity			<2.0		uS/cm		2	08-MAR-18
F-IC-N-VA	**Water**							
Batch R3984647								
WG2728681-2 LCS								
Fluoride (F)			98.9		%		90-110	08-MAR-18
WG2728681-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	08-MAR-18
WG2728681-4 MS		**L2064562-1**						
Fluoride (F)			N/A	MS-B	%		-	08-MAR-18
HG-D-CVAA-VA	**Water**							
Batch R3979012								
WG2728925-26 DUP		**L2064562-3**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	08-MAR-18
WG2728925-20 LCS								
Mercury (Hg)-Dissolved			104.1		%		80-120	08-MAR-18
WG2728925-24 LCS								
Mercury (Hg)-Dissolved			101.9		%		80-120	08-MAR-18
WG2728925-19 MB								
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	08-MAR-18
WG2728925-23 MB								
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	08-MAR-18
WG2728925-25 MS		**L2064562-2**						
Mercury (Hg)-Dissolved			98.5		%		70-130	08-MAR-18
HG-T-CVAA-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-VA	**Water**							
Batch R3979012								
WG2728896-2 LCS								
Mercury (Hg)-Total			101.4		%		80-120	08-MAR-18
WG2728896-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	08-MAR-18
MET-D-CCMS-VA	**Water**							
Batch R3984972								
WG2730193-2 LCS								
Aluminum (Al)-Dissolved			106.4		%		80-120	13-MAR-18
Antimony (Sb)-Dissolved			103.2		%		80-120	13-MAR-18
Arsenic (As)-Dissolved			102.5		%		80-120	13-MAR-18
Barium (Ba)-Dissolved			102.0		%		80-120	13-MAR-18
Bismuth (Bi)-Dissolved			107.3		%		80-120	13-MAR-18
Boron (B)-Dissolved			100.3		%		80-120	13-MAR-18
Cadmium (Cd)-Dissolved			103.2		%		80-120	13-MAR-18
Calcium (Ca)-Dissolved			101.8		%		80-120	13-MAR-18
Chromium (Cr)-Dissolved			98.8		%		80-120	13-MAR-18
Cobalt (Co)-Dissolved			103.9		%		80-120	13-MAR-18
Copper (Cu)-Dissolved			102.9		%		80-120	13-MAR-18
Iron (Fe)-Dissolved			101.8		%		80-120	13-MAR-18
Lead (Pb)-Dissolved			107.6		%		80-120	13-MAR-18
Lithium (Li)-Dissolved			92.2		%		80-120	13-MAR-18
Magnesium (Mg)-Dissolved			106.5		%		80-120	13-MAR-18
Manganese (Mn)-Dissolved			106.7		%		80-120	13-MAR-18
Molybdenum (Mo)-Dissolved			106.5		%		80-120	13-MAR-18
Nickel (Ni)-Dissolved			102.1		%		80-120	13-MAR-18
Potassium (K)-Dissolved			108.8		%		80-120	13-MAR-18
Selenium (Se)-Dissolved			105.0		%		80-120	13-MAR-18
Silicon (Si)-Dissolved			103.4		%		80-120	13-MAR-18
Silver (Ag)-Dissolved			106.4		%		80-120	13-MAR-18
Sodium (Na)-Dissolved			110.9		%		80-120	13-MAR-18
Strontium (Sr)-Dissolved			102.5		%		80-120	13-MAR-18
Thallium (Tl)-Dissolved			101.0		%		80-120	13-MAR-18
Tin (Sn)-Dissolved			103.2		%		80-120	13-MAR-18
Titanium (Ti)-Dissolved			95.5		%		80-120	13-MAR-18
Uranium (U)-Dissolved			102.1		%		80-120	13-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3984972								
WG2730193-2 LCS								
Vanadium (V)-Dissolved			106.5		%		80-120	13-MAR-18
Zinc (Zn)-Dissolved			96.9		%		80-120	13-MAR-18
WG2730193-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	13-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	13-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	13-MAR-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	13-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	13-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	13-MAR-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	13-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	13-MAR-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	13-MAR-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	13-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	13-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	13-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	13-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	13-MAR-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	13-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	13-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	13-MAR-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	13-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	13-MAR-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	13-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	13-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	13-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	13-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	13-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	13-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	13-MAR-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	13-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	13-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	13-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	13-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3985108								
WG2732016-2 LCS								
Aluminum (Al)-Dissolved			102.3		%		80-120	14-MAR-18
Antimony (Sb)-Dissolved			100.2		%		80-120	14-MAR-18
Arsenic (As)-Dissolved			97.4		%		80-120	14-MAR-18
Barium (Ba)-Dissolved			95.2		%		80-120	14-MAR-18
Bismuth (Bi)-Dissolved			96.1		%		80-120	14-MAR-18
Boron (B)-Dissolved			91.8		%		80-120	14-MAR-18
Cadmium (Cd)-Dissolved			96.5		%		80-120	14-MAR-18
Calcium (Ca)-Dissolved			98.3		%		80-120	14-MAR-18
Chromium (Cr)-Dissolved			93.9		%		80-120	14-MAR-18
Cobalt (Co)-Dissolved			95.8		%		80-120	14-MAR-18
Copper (Cu)-Dissolved			95.4		%		80-120	14-MAR-18
Iron (Fe)-Dissolved			101.9		%		80-120	14-MAR-18
Lead (Pb)-Dissolved			101.5		%		80-120	14-MAR-18
Lithium (Li)-Dissolved			100.1		%		80-120	14-MAR-18
Magnesium (Mg)-Dissolved			99.9		%		80-120	14-MAR-18
Manganese (Mn)-Dissolved			102.1		%		80-120	14-MAR-18
Molybdenum (Mo)-Dissolved			103.4		%		80-120	14-MAR-18
Nickel (Ni)-Dissolved			96.5		%		80-120	14-MAR-18
Potassium (K)-Dissolved			93.7		%		80-120	14-MAR-18
Selenium (Se)-Dissolved			97.8		%		80-120	14-MAR-18
Silicon (Si)-Dissolved			99.1		%		80-120	14-MAR-18
Silver (Ag)-Dissolved			103.0		%		80-120	14-MAR-18
Sodium (Na)-Dissolved			102.2		%		80-120	14-MAR-18
Strontium (Sr)-Dissolved			103.0		%		80-120	14-MAR-18
Thallium (Tl)-Dissolved			100.2		%		80-120	14-MAR-18
Tin (Sn)-Dissolved			97.1		%		80-120	14-MAR-18
Titanium (Ti)-Dissolved			94.7		%		80-120	14-MAR-18
Uranium (U)-Dissolved			103.7		%		80-120	14-MAR-18
Vanadium (V)-Dissolved			97.3		%		80-120	14-MAR-18
Zinc (Zn)-Dissolved			98.0		%		80-120	14-MAR-18
WG2732016-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	14-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	14-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	14-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3985108								
WG2732016-1 MB		**NP**						
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	14-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	14-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	14-MAR-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	14-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	14-MAR-18
Chromium (Cr)-Dissolved			<0.00010	MB-LOR	mg/L		0.0001	14-MAR-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	14-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	14-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	14-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	14-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	14-MAR-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	14-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	14-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	14-MAR-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	14-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	14-MAR-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	14-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	14-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	14-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	14-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	14-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	14-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	14-MAR-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	14-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	14-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	14-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	14-MAR-18
MET-T-CCMS-VA	**Water**							
Batch R3984572								
WG2730525-2 LCS								
Aluminum (Al)-Total			106.9		%		80-120	13-MAR-18
Antimony (Sb)-Total			108.2		%		80-120	13-MAR-18
Arsenic (As)-Total			103.1		%		80-120	13-MAR-18
Barium (Ba)-Total			102.2		%		80-120	13-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3984572								
WG2730525-2 LCS								
Bismuth (Bi)-Total			105.5		%		80-120	13-MAR-18
Boron (B)-Total			97.3		%		80-120	13-MAR-18
Cadmium (Cd)-Total			108.7		%		80-120	13-MAR-18
Calcium (Ca)-Total			104.5		%		80-120	13-MAR-18
Chromium (Cr)-Total			109.1		%		80-120	13-MAR-18
Cobalt (Co)-Total			106.1		%		80-120	13-MAR-18
Copper (Cu)-Total			104.7		%		80-120	13-MAR-18
Iron (Fe)-Total			100.7		%		80-120	13-MAR-18
Lead (Pb)-Total			102.5		%		80-120	13-MAR-18
Lithium (Li)-Total			104.1		%		80-120	13-MAR-18
Magnesium (Mg)-Total			108.7		%		80-120	13-MAR-18
Manganese (Mn)-Total			105.4		%		80-120	13-MAR-18
Molybdenum (Mo)-Total			102.3		%		80-120	13-MAR-18
Nickel (Ni)-Total			106.6		%		80-120	13-MAR-18
Potassium (K)-Total			108.8		%		80-120	13-MAR-18
Selenium (Se)-Total			104.1		%		80-120	13-MAR-18
Silicon (Si)-Total			103.9		%		80-120	13-MAR-18
Silver (Ag)-Total			101.1		%		80-120	13-MAR-18
Sodium (Na)-Total			108.2		%		80-120	13-MAR-18
Strontium (Sr)-Total			101.0		%		80-120	13-MAR-18
Thallium (Tl)-Total			100.1		%		80-120	13-MAR-18
Tin (Sn)-Total			101.7		%		80-120	13-MAR-18
Titanium (Ti)-Total			106.0		%		80-120	13-MAR-18
Uranium (U)-Total			104.6		%		80-120	13-MAR-18
Vanadium (V)-Total			105.3		%		80-120	13-MAR-18
Zinc (Zn)-Total			103.4		%		80-120	13-MAR-18
WG2730525-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	13-MAR-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	13-MAR-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	13-MAR-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	13-MAR-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	13-MAR-18
Boron (B)-Total			<0.010		mg/L		0.01	13-MAR-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	13-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3984572								
WG2730525-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	13-MAR-18
Chromium (Cr)-Total			0.00017	MB-LOR	mg/L		0.0001	13-MAR-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	13-MAR-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	13-MAR-18
Iron (Fe)-Total			<0.010		mg/L		0.01	13-MAR-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	13-MAR-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	13-MAR-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	13-MAR-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	13-MAR-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	13-MAR-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	13-MAR-18
Potassium (K)-Total			<0.050		mg/L		0.05	13-MAR-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	13-MAR-18
Silicon (Si)-Total			<0.10		mg/L		0.1	13-MAR-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	13-MAR-18
Sodium (Na)-Total			<0.050		mg/L		0.05	13-MAR-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	13-MAR-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	13-MAR-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	13-MAR-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	13-MAR-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	13-MAR-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	13-MAR-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	13-MAR-18
Batch R3985645								
WG2731996-2 LCS								
Aluminum (Al)-Total			105.8		%		80-120	14-MAR-18
Antimony (Sb)-Total			104.7		%		80-120	14-MAR-18
Arsenic (As)-Total			101.6		%		80-120	14-MAR-18
Barium (Ba)-Total			100.2		%		80-120	14-MAR-18
Bismuth (Bi)-Total			94.2		%		80-120	14-MAR-18
Boron (B)-Total			93.1		%		80-120	14-MAR-18
Cadmium (Cd)-Total			110.7		%		80-120	14-MAR-18
Calcium (Ca)-Total			101.1		%		80-120	14-MAR-18
Chromium (Cr)-Total			101.4		%		80-120	14-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3985645								
WG2731996-2 LCS								
Cobalt (Co)-Total			101.1		%		80-120	14-MAR-18
Copper (Cu)-Total			100.8		%		80-120	14-MAR-18
Iron (Fe)-Total			97.7		%		80-120	14-MAR-18
Lead (Pb)-Total			97.8		%		80-120	14-MAR-18
Lithium (Li)-Total			94.7		%		80-120	14-MAR-18
Magnesium (Mg)-Total			97.7		%		80-120	14-MAR-18
Manganese (Mn)-Total			103.8		%		80-120	14-MAR-18
Molybdenum (Mo)-Total			105.9		%		80-120	14-MAR-18
Nickel (Ni)-Total			102.2		%		80-120	14-MAR-18
Potassium (K)-Total			97.7		%		80-120	14-MAR-18
Selenium (Se)-Total			107.4		%		80-120	14-MAR-18
Silicon (Si)-Total			102.4		%		80-120	14-MAR-18
Silver (Ag)-Total			105.1		%		80-120	14-MAR-18
Sodium (Na)-Total			102.6		%		80-120	14-MAR-18
Strontium (Sr)-Total			109.9		%		80-120	14-MAR-18
Thallium (Tl)-Total			96.9		%		80-120	14-MAR-18
Tin (Sn)-Total			101.4		%		80-120	14-MAR-18
Titanium (Ti)-Total			97.9		%		80-120	14-MAR-18
Uranium (U)-Total			98.2		%		80-120	14-MAR-18
Vanadium (V)-Total			103.5		%		80-120	14-MAR-18
Zinc (Zn)-Total			96.2		%		80-120	14-MAR-18
WG2731996-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	14-MAR-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	14-MAR-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	14-MAR-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	14-MAR-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	14-MAR-18
Boron (B)-Total			<0.010		mg/L		0.01	14-MAR-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	14-MAR-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	14-MAR-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	14-MAR-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	14-MAR-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	14-MAR-18
Iron (Fe)-Total			<0.010		mg/L		0.01	14-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3985645								
WG2731996-1 MB								
Lead (Pb)-Total			<0.000050		mg/L		0.00005	14-MAR-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	14-MAR-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	14-MAR-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	14-MAR-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	14-MAR-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	14-MAR-18
Potassium (K)-Total			<0.050		mg/L		0.05	14-MAR-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	14-MAR-18
Silicon (Si)-Total			<0.10		mg/L		0.1	14-MAR-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	14-MAR-18
Sodium (Na)-Total			<0.050		mg/L		0.05	14-MAR-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	14-MAR-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	14-MAR-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	14-MAR-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	14-MAR-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	14-MAR-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	14-MAR-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	14-MAR-18
NH3-F-VA	**Water**							
Batch R3983750								
WG2730768-6 LCS								
Ammonia, Total (as N)			96.7		%		85-115	12-MAR-18
WG2730768-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	12-MAR-18
NO2-L-IC-N-VA	**Water**							
Batch R3984647								
WG2728681-2 LCS								
Nitrite (as N)			99.2		%		90-110	08-MAR-18
WG2728681-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	08-MAR-18
WG2728681-4 MS		**L2064562-1**						
Nitrite (as N)			92.8		%		75-125	08-MAR-18
NO3-L-IC-N-VA	**Water**							

Quality Control Report

Workorder: L2064562 Report Date: 23-JAN-19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-VA	**Water**							
Batch R3984647								
WG2728681-2 LCS								
Nitrate (as N)			99.7		%		90-110	08-MAR-18
WG2728681-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	08-MAR-18
WG2728681-4 MS		**L2064562-1**						
Nitrate (as N)			98.1		%		75-125	08-MAR-18
ORP-VA	**Water**							
Batch R3981490								
WG2730134-1 CRM		**VA-ORP**						
ORP			220		mV		210-230	09-MAR-18
P-T-PRES-COL-VA	**Water**							
Batch R3979198								
WG2728186-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			101.2		%		80-120	08-MAR-18
WG2728186-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	08-MAR-18
PH-PCT-VA	**Water**							
Batch R3979555								
WG2728678-2 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	08-MAR-18
PO4-DO-COL-VA	**Water**							
Batch R3978903								
WG2728666-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			94.2		%		80-120	08-MAR-18
WG2728666-6 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.9		%		80-120	08-MAR-18
WG2728666-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	08-MAR-18
WG2728666-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	08-MAR-18
SO4-IC-N-VA	**Water**							
Batch R3984647								
WG2728681-2 LCS								
Sulfate (SO4)			100.5		%		90-110	08-MAR-18
WG2728681-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-VA	**Water**							
Batch R3984647								
WG2728681-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	08-MAR-18
WG2728681-4 MS		**L2064562-1**						
Sulfate (SO4)			97.6		%		75-125	08-MAR-18
TDS-LOW-VA	**Water**							
Batch R3984694								
WG2730407-2 LCS								
Total Dissolved Solids			105.7		%		85-115	10-MAR-18
WG2730407-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	10-MAR-18
TKN-F-VA	**Water**							
Batch R3979543								
WG2728495-6 LCS								
Total Kjeldahl Nitrogen			102.8		%		75-125	08-MAR-18
WG2728495-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	08-MAR-18
TSS-LOW-VA	**Water**							
Batch R3983730								
WG2730379-2 LCS								
Total Suspended Solids			96.8		%		85-115	10-MAR-18
WG2730379-1 MB								
Total Suspended Solids			<1.0		mg/L		1	10-MAR-18
TURBIDITY-VA	**Water**							
Batch R3979558								
WG2729373-2 CRM		**VA-FORM-40**						
Turbidity			100.5		%		85-115	08-MAR-18
WG2729373-5 CRM		**VA-FORM-40**						
Turbidity			101.0		%		85-115	08-MAR-18
WG2729373-1 MB								
Turbidity			<0.10		NTU		0.1	08-MAR-18
WG2729373-4 MB								
Turbidity			<0.10		NTU		0.1	08-MAR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	06-MAR-18 11:07	09-MAR-18 22:00	0.25	83	hours	EHTR-FM
	2	06-MAR-18 13:18	09-MAR-18 22:00	0.25	81	hours	EHTR-FM
	3	06-MAR-18 13:40	09-MAR-18 22:00	0.25	80	hours	EHTR-FM
	4	06-MAR-18 12:45	09-MAR-18 22:00	0.25	81	hours	EHTR-FM
	5	06-MAR-18 12:45	09-MAR-18 22:00	0.25	81	hours	EHTR-FM
	6	06-MAR-18 12:45	09-MAR-18 22:00	0.25	81	hours	EHTR-FM
pH by Meter (Automated)							
	1	06-MAR-18 11:07	08-MAR-18 21:44	0.25	59	hours	EHTR-FM
	2	06-MAR-18 13:18	08-MAR-18 21:44	0.25	56	hours	EHTR-FM
	3	06-MAR-18 13:40	08-MAR-18 21:44	0.25	56	hours	EHTR-FM
	4	06-MAR-18 12:45	08-MAR-18 21:44	0.25	57	hours	EHTR-FM
	5	06-MAR-18 12:45	08-MAR-18 21:44	0.25	57	hours	EHTR-FM
	6	06-MAR-18 12:45	08-MAR-18 21:44	0.25	57	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2064562 were received on 07-MAR-18 09:25.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: GH_Q1_GW_1-3868650055-121017_JAN18 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Greenhills Operation			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jeremy Enns			Lab Contact	Can Dang			Email 1:	Jeremy.Enns@teck.com	X	X	X
Email	Jeremy.Enns@teck.com			Email	Can.Dang@alsglobal.com			Email 2:	Leigh.Stickney@teck.com	X	X	X
Address	P.O. BOX 5000			Address	8081 Lougheed Hwy			Email 3:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B1H0	Country	Canada	Postal Code		Country	Canada					
Phone Number	250-865-3341			Phone Number								

SAMPLE DETAILS | **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

L2064562-COFC

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-ROUTINE-VA	TECKCOAL-MET-T-VA
FIL.								N	N	N		N	N	N
PRESERV.								NONE	H2SO4	NONE	HCL	NONE	NONE	HNO3
ANALYSIS														
		WG				G								
GH_MW-RLP_WG_2018-01-01_NP	GH_MW-RLP	WG		3/6/2018	11:07	G	6	1	1	1	1	1	1	
[redacted]														
GH_POTW10_WG_2018-01-01_NP	GH_POTW10	WG		3/6/2018	13:18	G	7	1	1	1	1	1	1	1
GH_POTW15_WG_2018-01-01_NP	GH_POTW15	WG		3/6/2018	13:40	G	7	1	1	1	1	1	1	1
GH_POTW17_WG_2018-01-01_NP	GH_POTW17	WG		3/6/2018	12:45	G	7	1	1	1	1	1	1	1
GH_GWB1_WG_2018-01-01_NP	GH_GWB1	WG		3/6/2018	12:46	G	7	1	1	1	1	1	1	1
GH_GWD1_WG_2018-01-01_NP	GH_GWD1	WG		3/6/2018	12:45	G	7	1	1	1	1	1	1	1

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	J. Kropp	03/06/18	JC 9,6'c	7 Mar 18 9:25am

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	J. Kropp	Mobile #	250-423-0826
Sampler's Signature	J Kropp	Date/Time	

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
P.O. Box 5000
Elkford BC V0B 1H0

Date Received: 12-MAR-18
Report Date: 22-JAN-19 16:15 (MT)
Version: FINAL REV. 2

Client Phone: 250-865-3284

Certificate of Analysis

Lab Work Order #: L2066289

Project P.O. #: 540380
Job Reference: GREENHILLS OPERATION
C of C Numbers:
Legal Site Desc:

Comments:

22-JAN-2019 Revision 2: The sample collection date has been modified.

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2066289-1	L2066289-2	L2066289-3		
	Description	WG	WG	WG		
	Sampled Date	07-MAR-18	07-MAR-18	07-MAR-18		
	Sampled Time	13:30	11:50	11:50		
	Client ID	GH_GA-MW-3_WG_2018-01-01_NP	GH_MW-ERSC-1_WG_2018-01-01_NP	GH_GWB3_WG_2018-01-01_NP		
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	576	1190	<2.0		
	Hardness (as CaCO3) (mg/L)	232	674	<0.50		
	pH (pH)	8.36	7.81	5.35		
	ORP (mV)	156	217	283		
	Total Suspended Solids (mg/L)	7.1	2.4	<1.0		
	Total Dissolved Solids (mg/L)	328	906	<3.0		
	Turbidity (NTU)	34.8	1.98	<0.10		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	9.0	<1.0		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	278	192	<1.0		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	9.0	<1.0	<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	287	192	<1.0		
	Ammonia, Total (as N) (mg/L)	0.367	0.0060	<0.0050		
	Bromide (Br) (mg/L)	<0.050	<0.25 DLDS	<0.050		
	Chloride (Cl) (mg/L)	6.06	8.98	<0.10		
	Fluoride (F) (mg/L)	0.728	0.13	<0.020		
	Nitrate (as N) (mg/L)	<0.0050	13.4	<0.0050		
	Nitrite (as N) (mg/L)	<0.0010	<0.0050 DLDS	<0.0010		
	Total Kjeldahl Nitrogen (mg/L)	0.382	0.304 TKNI	<0.050		
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	0.0023	<0.0010		
	Phosphorus (P)-Total (mg/L)	0.0201	0.0086	<0.0020		
	Sulfate (SO4) (mg/L)	27.4	432	<0.30		
	Anion Sum (meq/L)	6.52	14.1	<0.10		
	Cation Sum (meq/L)	6.30	13.8	<0.10		
	Cation - Anion Balance (%)	-1.7	-1.0	0.0		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.31	1.68	1.51		
	Total Organic Carbon (mg/L)	0.54 RRV	1.35	<0.50 RRV		
Total Metals	Mercury (Hg)-Total (mg/L)	<0.000050	<0.000050	<0.000050		
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030		
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Arsenic (As)-Dissolved (mg/L)	<0.00010	0.00012	<0.00010		
	Barium (Ba)-Dissolved (mg/L)	0.107	0.206	<0.000050		
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.00010 DLA	<0.000050	<0.000050		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2066289-1	L2066289-2	L2066289-3		
	Description	WG	WG	WG		
	Sampled Date	07-MAR-18	07-MAR-18	07-MAR-18		
	Sampled Time	13:30	11:50	11:50		
	Client ID	GH_GA-MW-3_WG_2018-01-01_NP	GH_MW-ERSC-1_WG_2018-01-01_NP	GH_GWB3_WG_2018-01-01_NP		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Boron (B)-Dissolved (mg/L)	0.237	0.010	<0.010		
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	0.0747	<0.0050		
	Calcium (Ca)-Dissolved (mg/L)	43.1	166	<0.050		
	Chromium (Cr)-Dissolved (mg/L)	0.00027	0.00019	<0.00010		
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10		
	Copper (Cu)-Dissolved (mg/L)	<0.00050	0.00155	<0.00050		
	Iron (Fe)-Dissolved (mg/L)	0.013	<0.010	<0.010		
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
	Lithium (Li)-Dissolved (mg/L)	0.0944	0.0121	<0.0010		
	Magnesium (Mg)-Dissolved (mg/L)	30.1	62.8	<0.10		
	Manganese (Mn)-Dissolved (mg/L)	0.00891	0.00406	<0.00010		
	Mercury (Hg)-Dissolved (mg/L)	<0.000050 DLM	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.00135	<0.000050		
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00103	<0.00050		
	Potassium (K)-Dissolved (mg/L)	2.44	1.01	<0.050		
	Selenium (Se)-Dissolved (ug/L)	<0.10 DLA	68.1	<0.050		
	Silicon (Si)-Dissolved (mg/L)	4.80	2.66	<0.050		
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	36.2	6.57	<0.050		
	Strontium (Sr)-Dissolved (mg/L)	2.21	0.611	<0.00020		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000029	<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	0.000036	0.00180	<0.000010		
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Total Organic Carbon	MS-B	L2066289-2
Matrix Spike	Total Organic Carbon	MS-B	L2066289-2
Matrix Spike	Total Organic Carbon	MS-B	L2066289-1, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2066289-1, -2, -3
Matrix Spike	Boron (B)-Dissolved	MS-B	L2066289-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2066289-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2066289-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2066289-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2066289-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Reference Information

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-TOT-CVAFS-VA Water Total Hg in Water by CVAFS LOR=50ppt EPA 1631E (mod)

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TECK COAL LIMITED (GREENHILLS)
P.O. Box 5000
Elkford BC V0B 1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R3984764								
WG2731227-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			108.0		%		85-115	13-MAR-18
WG2731227-5 DUP		**L2066289-2**						
Acidity (as CaCO3)		9.0	8.7		mg/L	3.4	20	13-MAR-18
WG2731227-1 MB								
Acidity (as CaCO3)			1.6		mg/L		2	13-MAR-18
ALK-TITR-VA	**Water**							
Batch R3984774								
WG2731226-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			101.1		%		85-115	13-MAR-18
WG2731226-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	13-MAR-18
BE-D-L-CCMS-VA	**Water**							
Batch R3988128								
WG2732732-2 LCS								
Beryllium (Be)-Dissolved			96.7		%		80-120	16-MAR-18
WG2732732-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	16-MAR-18
WG2732732-4 MS		**L2066289-1**						
Beryllium (Be)-Dissolved			91.6		%		70-130	16-MAR-18
BR-L-IC-N-VA	**Water**							
Batch R3984864								
WG2731225-3 DUP		**L2066289-1**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	13-MAR-18
WG2731225-2 LCS								
Bromide (Br)			99.5		%		85-115	13-MAR-18
WG2731225-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	13-MAR-18
CARBONS-DOC-VA	**Water**							
Batch R3985754								
WG2731993-12 LCS								
Dissolved Organic Carbon			103.8		%		80-120	14-MAR-18
WG2731993-4 LCS								
Dissolved Organic Carbon			104.3		%		80-120	14-MAR-18
WG2731993-8 LCS								
Dissolved Organic Carbon			104.5		%		80-120	14-MAR-18
WG2731993-11 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R3985754								
WG2731993-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	14-MAR-18
WG2731993-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	14-MAR-18
WG2731993-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	14-MAR-18
CARBONS-TOC-VA	**Water**							
Batch R3985058								
WG2731215-1 LCS								
Total Organic Carbon			101.0		%		80-120	13-MAR-18
WG2731215-13 LCS								
Total Organic Carbon			95.9		%		80-120	13-MAR-18
WG2731215-17 LCS								
Total Organic Carbon			101.4		%		80-120	13-MAR-18
WG2731215-5 LCS								
Total Organic Carbon			101.2		%		80-120	13-MAR-18
WG2731215-9 LCS								
Total Organic Carbon			100.9		%		80-120	13-MAR-18
WG2731215-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-MAR-18
WG2731215-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-MAR-18
WG2731215-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-MAR-18
WG2731215-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-MAR-18
Batch R3985752								
WG2731992-1 LCS								
Total Organic Carbon			102.2		%		80-120	14-MAR-18
WG2731992-13 LCS								
Total Organic Carbon			102.8		%		80-120	14-MAR-18
WG2731992-5 LCS								
Total Organic Carbon			103.7		%		80-120	14-MAR-18
WG2731992-9 LCS								
Total Organic Carbon			103.0		%		80-120	14-MAR-18
WG2731992-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	14-MAR-18
WG2731992-4 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-TOC-VA	**Water**							
Batch R3985752								
WG2731992-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	14-MAR-18
WG2731992-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	14-MAR-18
CL-L-IC-N-VA	**Water**							
Batch R3984864								
WG2731225-3 DUP		**L2066289-1**						
Chloride (Cl)		6.06	6.06		mg/L	0.1	20	13-MAR-18
WG2731225-2 LCS								
Chloride (Cl)			99.9		%		90-110	13-MAR-18
WG2731225-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	13-MAR-18
EC-PCT-VA	**Water**							
Batch R3984774								
WG2731226-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			96.7		%		90-110	13-MAR-18
WG2731226-1 MB								
Conductivity			<2.0		uS/cm		2	13-MAR-18
F-IC-N-VA	**Water**							
Batch R3984864								
WG2731225-3 DUP		**L2066289-1**						
Fluoride (F)		0.728	0.723		mg/L	0.7	20	13-MAR-18
WG2731225-2 LCS								
Fluoride (F)			101.7		%		90-110	13-MAR-18
WG2731225-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	13-MAR-18
HG-D-CVAA-VA	**Water**							
Batch R3985275								
WG2732366-2 LCS								
Mercury (Hg)-Dissolved			102.4		%		80-120	14-MAR-18
HG-TOT-CVAFS-VA	**Water**							
Batch R3985275								
WG2732293-2 LCS								
Mercury (Hg)-Total			102.7		%		80-120	14-MAR-18
WG2732293-1 MB								
Mercury (Hg)-Total			<0.000050		mg/L		0.00005	14-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3988128								
WG2732732-2 LCS								
Aluminum (Al)-Dissolved			98.2		%		80-120	16-MAR-18
Antimony (Sb)-Dissolved			98.2		%		80-120	16-MAR-18
Arsenic (As)-Dissolved			98.2		%		80-120	16-MAR-18
Barium (Ba)-Dissolved			96.7		%		80-120	16-MAR-18
Bismuth (Bi)-Dissolved			101.6		%		80-120	16-MAR-18
Boron (B)-Dissolved			95.1		%		80-120	16-MAR-18
Cadmium (Cd)-Dissolved			101.3		%		80-120	16-MAR-18
Calcium (Ca)-Dissolved			100.8		%		80-120	16-MAR-18
Chromium (Cr)-Dissolved			100.5		%		80-120	16-MAR-18
Cobalt (Co)-Dissolved			98.1		%		80-120	16-MAR-18
Copper (Cu)-Dissolved			97.9		%		80-120	16-MAR-18
Iron (Fe)-Dissolved			96.4		%		80-120	16-MAR-18
Lead (Pb)-Dissolved			100.3		%		80-120	16-MAR-18
Lithium (Li)-Dissolved			96.9		%		80-120	16-MAR-18
Magnesium (Mg)-Dissolved			100.6		%		80-120	16-MAR-18
Manganese (Mn)-Dissolved			96.1		%		80-120	16-MAR-18
Molybdenum (Mo)-Dissolved			100.5		%		80-120	16-MAR-18
Nickel (Ni)-Dissolved			97.5		%		80-120	16-MAR-18
Potassium (K)-Dissolved			101.7		%		80-120	16-MAR-18
Selenium (Se)-Dissolved			96.2		%		80-120	16-MAR-18
Silicon (Si)-Dissolved			98.5		%		80-120	16-MAR-18
Silver (Ag)-Dissolved			101.8		%		80-120	16-MAR-18
Sodium (Na)-Dissolved			97.9		%		80-120	16-MAR-18
Strontium (Sr)-Dissolved			97.3		%		80-120	16-MAR-18
Thallium (Tl)-Dissolved			97.6		%		80-120	16-MAR-18
Tin (Sn)-Dissolved			98.8		%		80-120	16-MAR-18
Titanium (Ti)-Dissolved			103.7		%		80-120	16-MAR-18
Uranium (U)-Dissolved			102.8		%		80-120	16-MAR-18
Vanadium (V)-Dissolved			100.2		%		80-120	16-MAR-18
Zinc (Zn)-Dissolved			96.2		%		80-120	16-MAR-18
WG2732732-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	16-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	16-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	16-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3988128								
WG2732732-1 MB		**NP**						
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	16-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	16-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	16-MAR-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	16-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	16-MAR-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	16-MAR-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	16-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	16-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	16-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	16-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	16-MAR-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	16-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	16-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	16-MAR-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	16-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	16-MAR-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	16-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	16-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	16-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	16-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	16-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	16-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	16-MAR-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	16-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	16-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	16-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	16-MAR-18
WG2732732-4 MS		**L2066289-1**						
Aluminum (Al)-Dissolved			95.0		%		70-130	16-MAR-18
Antimony (Sb)-Dissolved			91.5		%		70-130	16-MAR-18
Arsenic (As)-Dissolved			93.2		%		70-130	16-MAR-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	16-MAR-18
Boron (B)-Dissolved			N/A	MS-B	%		-	16-MAR-18
Cadmium (Cd)-Dissolved			103.0		%		70-130	16-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3988128								
WG2732732-4 MS		**L2066289-1**						
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	16-MAR-18
Chromium (Cr)-Dissolved			95.2		%		70-130	16-MAR-18
Cobalt (Co)-Dissolved			90.8		%		70-130	16-MAR-18
Iron (Fe)-Dissolved			86.2		%		70-130	16-MAR-18
Lead (Pb)-Dissolved			94.1		%		70-130	16-MAR-18
Lithium (Li)-Dissolved			82.4		%		70-130	16-MAR-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	16-MAR-18
Manganese (Mn)-Dissolved			90.7		%		70-130	16-MAR-18
Molybdenum (Mo)-Dissolved			78.7		%		70-130	16-MAR-18
Nickel (Ni)-Dissolved			89.9		%		70-130	16-MAR-18
Potassium (K)-Dissolved			92.7		%		70-130	16-MAR-18
Silicon (Si)-Dissolved			83.5		%		70-130	16-MAR-18
Silver (Ag)-Dissolved			70.6		%		70-130	16-MAR-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	16-MAR-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	16-MAR-18
Thallium (Tl)-Dissolved			91.7		%		70-130	16-MAR-18
Tin (Sn)-Dissolved			99.6		%		70-130	16-MAR-18
Titanium (Ti)-Dissolved			101.7		%		70-130	16-MAR-18
Uranium (U)-Dissolved			98.3		%		70-130	16-MAR-18
Vanadium (V)-Dissolved			95.2		%		70-130	16-MAR-18
Zinc (Zn)-Dissolved			90.4		%		70-130	16-MAR-18
Batch R3990348								
WG2735456-2 LCS								
Aluminum (Al)-Dissolved			95.1		%		80-120	19-MAR-18
Antimony (Sb)-Dissolved			99.5		%		80-120	19-MAR-18
Arsenic (As)-Dissolved			98.8		%		80-120	19-MAR-18
Barium (Ba)-Dissolved			98.8		%		80-120	19-MAR-18
Bismuth (Bi)-Dissolved			103.9		%		80-120	19-MAR-18
Boron (B)-Dissolved			98.8		%		80-120	19-MAR-18
Cadmium (Cd)-Dissolved			101.4		%		80-120	19-MAR-18
Calcium (Ca)-Dissolved			100.3		%		80-120	19-MAR-18
Chromium (Cr)-Dissolved			96.9		%		80-120	19-MAR-18
Cobalt (Co)-Dissolved			97.9		%		80-120	19-MAR-18
Copper (Cu)-Dissolved			99.4		%		80-120	19-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3990348								
WG2735456-2 LCS								
Iron (Fe)-Dissolved			96.6		%		80-120	19-MAR-18
Lead (Pb)-Dissolved			103.4		%		80-120	19-MAR-18
Lithium (Li)-Dissolved			103.0		%		80-120	19-MAR-18
Magnesium (Mg)-Dissolved			100.5		%		80-120	19-MAR-18
Manganese (Mn)-Dissolved			101.9		%		80-120	19-MAR-18
Molybdenum (Mo)-Dissolved			102.7		%		80-120	19-MAR-18
Nickel (Ni)-Dissolved			99.2		%		80-120	19-MAR-18
Potassium (K)-Dissolved			97.7		%		80-120	19-MAR-18
Selenium (Se)-Dissolved			102.1		%		80-120	19-MAR-18
Silicon (Si)-Dissolved			99.2		%		80-120	19-MAR-18
Silver (Ag)-Dissolved			105.6		%		80-120	19-MAR-18
Sodium (Na)-Dissolved			104.6		%		80-120	19-MAR-18
Strontium (Sr)-Dissolved			97.1		%		80-120	19-MAR-18
Thallium (Tl)-Dissolved			102.3		%		80-120	19-MAR-18
Tin (Sn)-Dissolved			101.0		%		80-120	19-MAR-18
Titanium (Ti)-Dissolved			92.8		%		80-120	19-MAR-18
Uranium (U)-Dissolved			101.1		%		80-120	19-MAR-18
Vanadium (V)-Dissolved			102.4		%		80-120	19-MAR-18
Zinc (Zn)-Dissolved			93.1		%		80-120	19-MAR-18
WG2735456-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	19-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	19-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	19-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	19-MAR-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	19-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	19-MAR-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	19-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	19-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	19-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	19-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3990348								
WG2735456-1 MB		**NP**						
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	19-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	19-MAR-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	19-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	19-MAR-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	19-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	19-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	19-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	19-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	19-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	19-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	19-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	19-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	19-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	19-MAR-18
WG2735456-4 MS		**L2066289-3**						
Aluminum (Al)-Dissolved			98.8		%		70-130	19-MAR-18
Antimony (Sb)-Dissolved			98.4		%		70-130	19-MAR-18
Arsenic (As)-Dissolved			98.5		%		70-130	19-MAR-18
Barium (Ba)-Dissolved			97.1		%		70-130	19-MAR-18
Boron (B)-Dissolved			100.4		%		70-130	19-MAR-18
Cadmium (Cd)-Dissolved			106.5		%		70-130	19-MAR-18
Calcium (Ca)-Dissolved			99.96		%		70-130	19-MAR-18
Chromium (Cr)-Dissolved			100.3		%		70-130	19-MAR-18
Cobalt (Co)-Dissolved			102.8		%		70-130	19-MAR-18
Copper (Cu)-Dissolved			104.9		%		70-130	19-MAR-18
Iron (Fe)-Dissolved			100.6		%		70-130	19-MAR-18
Lead (Pb)-Dissolved			98.2		%		70-130	19-MAR-18
Lithium (Li)-Dissolved			105.0		%		70-130	19-MAR-18
Magnesium (Mg)-Dissolved			103.9		%		70-130	19-MAR-18
Manganese (Mn)-Dissolved			103.8		%		70-130	19-MAR-18
Molybdenum (Mo)-Dissolved			91.9		%		70-130	19-MAR-18
Nickel (Ni)-Dissolved			103.3		%		70-130	19-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3990348								
WG2735456-4 MS		**L2066289-3**						
Potassium (K)-Dissolved			100.9		%		70-130	19-MAR-18
Selenium (Se)-Dissolved			105.9		%		70-130	19-MAR-18
Silicon (Si)-Dissolved			93.7		%		70-130	19-MAR-18
Silver (Ag)-Dissolved			100.3		%		70-130	19-MAR-18
Sodium (Na)-Dissolved			98.6		%		70-130	19-MAR-18
Strontium (Sr)-Dissolved			95.7		%		70-130	19-MAR-18
Thallium (Tl)-Dissolved			98.0		%		70-130	19-MAR-18
Tin (Sn)-Dissolved			97.6		%		70-130	19-MAR-18
Titanium (Ti)-Dissolved			94.7		%		70-130	19-MAR-18
Uranium (U)-Dissolved			98.3		%		70-130	19-MAR-18
Vanadium (V)-Dissolved			102.7		%		70-130	19-MAR-18
Zinc (Zn)-Dissolved			99.7		%		70-130	19-MAR-18
NH3-F-VA	**Water**							
Batch R3987987								
WG2735236-10 LCS								
Ammonia, Total (as N)			101.0		%		85-115	19-MAR-18
WG2735236-9 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	19-MAR-18
NO2-L-IC-N-VA	**Water**							
Batch R3984864								
WG2731225-3 DUP		**L2066289-1**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	13-MAR-18
WG2731225-2 LCS								
Nitrite (as N)			100.5		%		90-110	13-MAR-18
WG2731225-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	13-MAR-18
NO3-L-IC-N-VA	**Water**							
Batch R3984864								
WG2731225-3 DUP		**L2066289-1**						
Nitrate (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	13-MAR-18
WG2731225-2 LCS								
Nitrate (as N)			100.8		%		90-110	13-MAR-18
WG2731225-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	13-MAR-18
ORP-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ORP-VA	**Water**							
Batch R3985022								
WG2731962-1 CRM		**VA-ORP**						
ORP			219		mV		210-230	13-MAR-18
WG2731962-2 DUP		**L2066289-1**						
ORP		156	159	J	mV	2.8	15	13-MAR-18
P-T-PRES-COL-VA	**Water**							
Batch R3983978								
WG2731244-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			101.7		%		80-120	13-MAR-18
WG2731244-3 DUP		**L2066289-2**						
Phosphorus (P)-Total		0.0086	0.0083		mg/L	3.5	20	13-MAR-18
WG2731244-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	13-MAR-18
WG2731244-4 MS		**L2066289-3**						
Phosphorus (P)-Total			104.8		%		70-130	13-MAR-18
PH-PCT-VA	**Water**							
Batch R3984774								
WG2731226-2 CRM		**VA-PH7-BUF**						
pH			7.00		pH		6.9-7.1	13-MAR-18
PO4-DO-COL-VA	**Water**							
Batch R3983890								
WG2731224-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			100.7		%		80-120	13-MAR-18
WG2731224-6 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			101.3		%		80-120	13-MAR-18
WG2731224-3 DUP		**L2066289-1**						
Orthophosphate-Dissolved (as P)		<0.0010	0.0010	RPD-NA	mg/L	N/A	20	13-MAR-18
WG2731224-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	13-MAR-18
WG2731224-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	13-MAR-18
WG2731224-4 MS		**L2066289-2**						
Orthophosphate-Dissolved (as P)			101.6		%		70-130	13-MAR-18
SO4-IC-N-VA	**Water**							
Batch R3984864								
WG2731225-3 DUP		**L2066289-1**						
Sulfate (SO4)		27.4	27.5		mg/L	0.2	20	13-MAR-18
WG2731225-2 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-VA	**Water**							
Batch R3984864								
WG2731225-2 LCS								
Sulfate (SO4)			101.0		%		90-110	13-MAR-18
WG2731225-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	13-MAR-18
TDS-LOW-VA	**Water**							
Batch R3985305								
WG2731222-3 DUP		**L2066289-1**						
Total Dissolved Solids		328	322		mg/L	1.7	20	13-MAR-18
WG2731222-2 LCS								
Total Dissolved Solids			99.8		%		85-115	13-MAR-18
WG2731222-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	13-MAR-18
TKN-F-VA	**Water**							
Batch R3986164								
WG2732286-2 LCS								
Total Kjeldahl Nitrogen			102.0		%		75-125	15-MAR-18
WG2732286-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	15-MAR-18
TSS-LOW-VA	**Water**							
Batch R3985232								
WG2731485-2 LCS								
Total Suspended Solids			94.8		%		85-115	13-MAR-18
WG2731485-1 MB								
Total Suspended Solids			<1.0		mg/L		1	13-MAR-18
TURBIDITY-VA	**Water**							
Batch R3985023								
WG2731925-2 CRM		**VA-FORM-40**						
Turbidity			101.0		%		85-115	13-MAR-18
WG2731925-5 CRM		**VA-FORM-40**						
Turbidity			100.8		%		85-115	13-MAR-18
WG2731925-3 DUP		**L2066289-1**						
Turbidity		34.8	35.3		NTU	1.4	15	13-MAR-18
WG2731925-1 MB								
Turbidity			<0.10		NTU		0.1	13-MAR-18
WG2731925-4 MB								
Turbidity			<0.10		NTU		0.1	13-MAR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	07-MAR-18 13:30	13-MAR-18 22:30	0.25	153	hours	EHTR-FM
	2	07-MAR-18 11:50	13-MAR-18 22:30	0.25	155	hours	EHTR-FM
	3	07-MAR-18 11:50	13-MAR-18 22:30	0.25	155	hours	EHTR-FM
Turbidity by Meter							
	1	07-MAR-18 13:30	13-MAR-18 22:46	3	6	days	EHTR
	2	07-MAR-18 11:50	13-MAR-18 22:46	3	6	days	EHTR
	3	07-MAR-18 11:50	13-MAR-18 22:46	3	6	days	EHTR
pH by Meter (Automated)							
	1	07-MAR-18 13:30	13-MAR-18 12:36	0.25	143	hours	EHTR-FM
	2	07-MAR-18 11:50	13-MAR-18 12:36	0.25	145	hours	EHTR-FM
	3	07-MAR-18 11:50	13-MAR-18 12:36	0.25	145	hours	EHTR-FM
Anions and Nutrients							
Diss. Orthophosphate in Water by Colour							
	1	07-MAR-18 13:30	13-MAR-18 00:24	3	5	days	EHTR
	2	07-MAR-18 11:50	13-MAR-18 00:24	3	6	days	EHTR
	3	07-MAR-18 11:50	13-MAR-18 00:24	3	6	days	EHTR
Nitrate in Water by IC (Low Level)							
	1	07-MAR-18 13:30	13-MAR-18 05:08	3	6	days	EHTR
	2	07-MAR-18 11:50	13-MAR-18 05:08	3	6	days	EHTR
	3	07-MAR-18 11:50	13-MAR-18 05:08	3	6	days	EHTR
Nitrite in Water by IC (Low Level)							
	1	07-MAR-18 13:30	13-MAR-18 05:08	3	6	days	EHTR
	2	07-MAR-18 11:50	13-MAR-18 05:08	3	6	days	EHTR
	3	07-MAR-18 11:50	13-MAR-18 05:08	3	6	days	EHTR

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2066289 were received on 12-MAR-18 08:15.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: GH_Q1_GW_1-3868650055-121017_JAN18

TURNAROUND TIME: RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Greenhills Operation			Lab Name	ALS Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jeremy Enns			Lab Contact	Can Dang			Email 1:	Jeremy.Enns@teck.com	X	X	X
Email	Jeremy.Enns@teck.com			Email	Can.Dang@alsglobal.com			Email 2:	Leigh.Stickney@teck.com	X	X	X
Address	P.O. BOX 5000			Address	8081 Lougheed Hwy			Email 3:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number	540380			
Postal Code	V0B1H0	Country	Canada	Postal Code		Country	Canada					
Phone Number	250-865-3341			Phone Number								

SAMPLE DETAILS

L2066289-COFC

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS												
								N	NONE	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-ROUTINE-VA	TECKCOAL-MET-T-VA						
		WG				G																
GH_GA-MW-3_WG_2018-01-01_NP	GH_GA-MW-3	WG		3/6/2018	13:30	G	6	N	H2SO4	1	1	1	1	1	1							
GH_MW-ERSC-1_WG_2018-01-01_NP	GH_MW-ERSC-1	WG		3/6/2018	11:50	G	6	N	NONE	1	1	1	1	1	1							
GH_GWB3_WG_2018-01-01_NP	GH_GWB3	WG		3/6/2018	11:50	G	6	N	HCL	1	1	1	1	1	1							
								N	NONE													
								N	NONE													
								N	HNO3													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
J.Kropp			
			May 12th 2018
			8:15
			9.1°C

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	J.Kropp	Mobile #	250 423 0826
Sampler's Signature	J.Kropp	Date/Time	

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
P.O. Box 5000
Elkford BC V0B 1H0

Date Received: 16-MAR-18
Report Date: 26-MAR-18 15:46 (MT)
Version: FINAL

Client Phone: 250-865-3284

Certificate of Analysis

Lab Work Order #: L2068735

Project P.O. #: 540380
Job Reference: GREENHILLS OPERATION
C of C Numbers: GHQ1GW1-3868650055
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2068735-1	L2068735-2			
	Description	WG	WG			
	Sampled Date	13-MAR-18	13-MAR-18			
	Sampled Time	11:45	10:00			
	Client ID	GH_GA-MW-1_WG_2017-10-01_NP	GH_POT09_WG_2018-01-01_NP			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	1360	745			
	Hardness (as CaCO3) (mg/L)	315	407			
	pH (pH)	8.23	8.19			
	ORP (mV)	251	260			
	Total Suspended Solids (mg/L)	13.9	1.2			
	Total Dissolved Solids (mg/L)	837	472			
	Turbidity (NTU)	8.38	3.33			
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	1.8	2.3			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	384	242			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	7.4			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	384	250			
	Ammonia, Total (as N) (mg/L)	0.219	0.0261			
	Bromide (Br) (mg/L)	0.45	<0.25 DLDS			
	Chloride (Cl) (mg/L)	23.9	6.59			
	Fluoride (F) (mg/L)	0.57	0.77			
	Nitrate (as N) (mg/L)	0.384	<0.025 DLDS			
	Nitrite (as N) (mg/L)	0.0114	<0.0050 DLDS			
	Total Kjeldahl Nitrogen (mg/L)	0.406	<0.050			
	Orthophosphate-Dissolved (as P) (mg/L)	0.0202	<0.0010			
	Phosphorus (P)-Total (mg/L)	0.0632	<0.0020			
	Sulfate (SO4) (mg/L)	344	165			
	Anion Sum (meq/L)	15.6	8.65			
	Cation Sum (meq/L)	14.3	8.48			
	Cation - Anion Balance (%)	-4.1	-1.0			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	5.24	0.73			
	Total Organic Carbon (mg/L)	5.54	0.56			
Total Metals	Aluminum (Al)-Total (mg/L)		<0.0030			
	Antimony (Sb)-Total (mg/L)		<0.00010			
	Arsenic (As)-Total (mg/L)		0.00054			
	Barium (Ba)-Total (mg/L)		0.0347			
	Beryllium (Be)-Total (ug/L)		<0.020			
	Bismuth (Bi)-Total (mg/L)		<0.000050			
	Boron (B)-Total (mg/L)		0.021			
	Cadmium (Cd)-Total (ug/L)		0.0202			
	Calcium (Ca)-Total (mg/L)		94.5			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2068735-1	L2068735-2			
	Description	WG	WG			
	Sampled Date	13-MAR-18	13-MAR-18			
	Sampled Time	11:45	10:00			
	Client ID	GH_GA-MW-1_WG_2017-10-01_NP	GH_POT09_WG_2018-01-01_NP			
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)		<0.00010			
	Cobalt (Co)-Total (ug/L)		0.21			
	Copper (Cu)-Total (mg/L)		0.0168			
	Iron (Fe)-Total (mg/L)		0.233			
	Lead (Pb)-Total (mg/L)		0.000732			
	Lithium (Li)-Total (mg/L)		0.0118			
	Magnesium (Mg)-Total (mg/L)		41.6			
	Manganese (Mn)-Total (mg/L)		0.209			
	Mercury (Hg)-Total (mg/L)	<0.000025 DLM	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)		0.00284			
	Nickel (Ni)-Total (mg/L)		0.0336			
	Potassium (K)-Total (mg/L)		1.64			
	Selenium (Se)-Total (ug/L)		1.05			
	Silicon (Si)-Total (mg/L)		5.02			
	Silver (Ag)-Total (mg/L)		<0.000010			
	Sodium (Na)-Total (mg/L)		6.63			
	Strontium (Sr)-Total (mg/L)		0.356			
	Thallium (Tl)-Total (mg/L)		0.000016			
	Tin (Sn)-Total (mg/L)		<0.00010			
	Titanium (Ti)-Total (mg/L)		<0.010			
	Uranium (U)-Total (mg/L)		0.00225			
	Vanadium (V)-Total (mg/L)		<0.00050			
	Zinc (Zn)-Total (mg/L)		0.0381			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0064	<0.0030			
	Antimony (Sb)-Dissolved (mg/L)	0.00182	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00062	0.00043			
	Barium (Ba)-Dissolved (mg/L)	0.0471	0.0325			
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	0.747	0.025			
	Cadmium (Cd)-Dissolved (ug/L)	0.0546	0.0098			
	Calcium (Ca)-Dissolved (mg/L)	69.2	98.5			
	Chromium (Cr)-Dissolved (mg/L)	0.00023	<0.00010			
	Cobalt (Co)-Dissolved (ug/L)	0.80	0.18			
	Copper (Cu)-Dissolved (mg/L)	0.134	0.00163			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2068735-1	L2068735-2			
	Description	WG	WG			
	Sampled Date	13-MAR-18	13-MAR-18			
	Sampled Time	11:45	10:00			
	Client ID	GH_GA-MW-1_WG_2017-10-01_NP	GH_POT09_WG_2018-01-01_NP			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	0.055	0.138			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	0.147	0.0117			
	Magnesium (Mg)-Dissolved (mg/L)	34.4	39.2			
	Manganese (Mn)-Dissolved (mg/L)	0.301	0.178			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.00921	0.00225			
	Nickel (Ni)-Dissolved (mg/L)	0.00376	0.00321			
	Potassium (K)-Dissolved (mg/L)	3.77	1.53			
	Selenium (Se)-Dissolved (ug/L)	0.093	1.04			
	Silicon (Si)-Dissolved (mg/L)	3.76	4.63			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	182	6.57			
	Strontium (Sr)-Dissolved (mg/L)	4.34	0.333			
	Thallium (Tl)-Dissolved (mg/L)	0.000046	0.000017			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.00270	0.00190			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	0.0177	0.0043			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Alkalinity, Total (as CaCO3)	B	L2068735-1
Method Blank	Alkalinity, Total (as CaCO3)	B	L2068735-2
Matrix Spike	Dissolved Organic Carbon	MS-B	L2068735-1
Matrix Spike	Total Organic Carbon	MS-B	L2068735-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2068735-2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2068735-2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2068735-2
Matrix Spike	Sodium (Na)-Total	MS-B	L2068735-2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2068735-2
Matrix Spike	Ammonia, Total (as N)	MS-B	L2068735-1, -2
Matrix Spike	Phosphorus (P)-Total	MS-B	L2068735-1, -2
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2068735-1, -2
Matrix Spike	Sulfate (SO4)	MS-B	L2068735-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

Reference Information

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

Reference Information

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GHQ1GW1-3868650055

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TECK COAL LIMITED (GREENHILLS)
P.O. Box 5000
Elkford BC V0B 1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R3989699								
WG2735312-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			109.0		%		85-115	19-MAR-18
WG2735458-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			115.0		%		85-115	19-MAR-18
WG2735312-1 MB								
Acidity (as CaCO3)			1.5		mg/L		2	19-MAR-18
WG2735458-1 MB								
Acidity (as CaCO3)			1.8		mg/L		2	19-MAR-18
ALK-TITR-VA	**Water**							
Batch R3990994								
WG2735224-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			100.6		%		85-115	20-MAR-18
WG2735309-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			106.0		%		85-115	20-MAR-18
WG2735224-1 MB								
Alkalinity, Total (as CaCO3)			1.4	B	mg/L		1	20-MAR-18
WG2735309-1 MB								
Alkalinity, Total (as CaCO3)			1.1	B	mg/L		1	20-MAR-18
BE-D-L-CCMS-VA	**Water**							
Batch R3991055								
WG2734666-2 LCS								
Beryllium (Be)-Dissolved			99.4		%		80-120	19-MAR-18
WG2734666-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	19-MAR-18
BE-T-L-CCMS-VA	**Water**							
Batch R3993213								
WG2735741-2 LCS								
Beryllium (Be)-Total			97.7		%		80-120	21-MAR-18
WG2735741-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	21-MAR-18
BR-L-IC-N-VA	**Water**							
Batch R3992987								
WG2735235-2 LCS								
Bromide (Br)			98.6		%		85-115	19-MAR-18
WG2735475-2 LCS								
Bromide (Br)			101.3		%		85-115	19-MAR-18
WG2735235-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-VA	**Water**							
Batch R3992987								
WG2735235-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAR-18
WG2735475-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAR-18
CARBONS-DOC-VA	**Water**							
Batch R3987457								
WG2734521-4 LCS								
Dissolved Organic Carbon			102.6		%		80-120	17-MAR-18
WG2734521-8 LCS								
Dissolved Organic Carbon			100.8		%		80-120	17-MAR-18
WG2734521-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	17-MAR-18
WG2734521-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	17-MAR-18
Batch R3989695								
WG2734742-12 LCS								
Dissolved Organic Carbon			102.0		%		80-120	18-MAR-18
WG2734742-4 LCS								
Dissolved Organic Carbon			105.4		%		80-120	18-MAR-18
WG2734742-8 LCS								
Dissolved Organic Carbon			105.0		%		80-120	18-MAR-18
WG2734742-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	18-MAR-18
WG2734742-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	18-MAR-18
WG2734742-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	18-MAR-18
CARBONS-TOC-VA	**Water**							
Batch R3987456								
WG2734520-1 LCS								
Total Organic Carbon			98.5		%		80-120	17-MAR-18
WG2734520-5 LCS								
Total Organic Carbon			100.8		%		80-120	17-MAR-18
WG2734520-9 LCS								
Total Organic Carbon			101.3		%		80-120	17-MAR-18
WG2734520-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	17-MAR-18
WG2734520-8 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-TOC-VA	**Water**							
Batch R3987456								
WG2734520-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	17-MAR-18
WG2734520-3 MS		**L2068735-1**						
Total Organic Carbon			N/A	MS-B	%		-	17-MAR-18
CL-L-IC-N-VA	**Water**							
Batch R3992987								
WG2735235-2 LCS								
Chloride (Cl)			99.7		%		90-110	19-MAR-18
WG2735475-2 LCS								
Chloride (Cl)			99.8		%		90-110	19-MAR-18
WG2735235-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	19-MAR-18
WG2735475-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	19-MAR-18
EC-PCT-VA	**Water**							
Batch R3990994								
WG2735224-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			102.1		%		90-110	20-MAR-18
WG2735309-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			103.9		%		90-110	20-MAR-18
WG2735224-1 MB								
Conductivity			<2.0		uS/cm		2	20-MAR-18
WG2735309-1 MB								
Conductivity			<2.0		uS/cm		2	20-MAR-18
F-IC-N-VA	**Water**							
Batch R3992987								
WG2735235-2 LCS								
Fluoride (F)			99.5		%		90-110	19-MAR-18
WG2735475-2 LCS								
Fluoride (F)			99.5		%		90-110	19-MAR-18
WG2735235-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-MAR-18
WG2735475-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-MAR-18
HG-D-CVAA-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R3990031								
WG2735023-10 LCS								
Mercury (Hg)-Dissolved			107.6		%		80-120	20-MAR-18
WG2735023-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	20-MAR-18
HG-T-CVAA-VA	**Water**							
Batch R3987482								
WG2734799-2 LCS								
Mercury (Hg)-Total			106.3		%		80-120	18-MAR-18
WG2734799-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	18-MAR-18
MET-D-CCMS-VA	**Water**							
Batch R3991055								
WG2734666-2 LCS								
Aluminum (Al)-Dissolved			97.6		%		80-120	19-MAR-18
Antimony (Sb)-Dissolved			95.0		%		80-120	19-MAR-18
Arsenic (As)-Dissolved			95.8		%		80-120	19-MAR-18
Barium (Ba)-Dissolved			98.1		%		80-120	19-MAR-18
Bismuth (Bi)-Dissolved			102.2		%		80-120	19-MAR-18
Boron (B)-Dissolved			99.2		%		80-120	19-MAR-18
Cadmium (Cd)-Dissolved			97.5		%		80-120	19-MAR-18
Calcium (Ca)-Dissolved			100.1		%		80-120	19-MAR-18
Chromium (Cr)-Dissolved			95.8		%		80-120	19-MAR-18
Cobalt (Co)-Dissolved			94.3		%		80-120	19-MAR-18
Copper (Cu)-Dissolved			92.4		%		80-120	19-MAR-18
Iron (Fe)-Dissolved			93.1		%		80-120	19-MAR-18
Lead (Pb)-Dissolved			100.9		%		80-120	19-MAR-18
Lithium (Li)-Dissolved			92.1		%		80-120	19-MAR-18
Magnesium (Mg)-Dissolved			91.1		%		80-120	19-MAR-18
Manganese (Mn)-Dissolved			97.0		%		80-120	19-MAR-18
Molybdenum (Mo)-Dissolved			94.2		%		80-120	19-MAR-18
Nickel (Ni)-Dissolved			94.9		%		80-120	19-MAR-18
Potassium (K)-Dissolved			96.5		%		80-120	19-MAR-18
Selenium (Se)-Dissolved			93.9		%		80-120	19-MAR-18
Silicon (Si)-Dissolved			91.0		%		80-120	19-MAR-18
Silver (Ag)-Dissolved			93.5		%		80-120	19-MAR-18
Sodium (Na)-Dissolved			102.9		%		80-120	19-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3991055								
WG2734666-2 LCS								
Strontium (Sr)-Dissolved			92.5		%		80-120	19-MAR-18
Thallium (Tl)-Dissolved			99.0		%		80-120	19-MAR-18
Tin (Sn)-Dissolved			96.4		%		80-120	19-MAR-18
Titanium (Ti)-Dissolved			87.9		%		80-120	19-MAR-18
Uranium (U)-Dissolved			98.2		%		80-120	19-MAR-18
Vanadium (V)-Dissolved			95.9		%		80-120	19-MAR-18
Zinc (Zn)-Dissolved			92.7		%		80-120	19-MAR-18
WG2734666-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	19-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	19-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	19-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	19-MAR-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	19-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	19-MAR-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	19-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	19-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	19-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	19-MAR-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	19-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	19-MAR-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	19-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	19-MAR-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	19-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	19-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	19-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	19-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	19-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	19-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	19-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3991055								
WG2734666-1 MB		**NP**						
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	19-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	19-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	19-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	19-MAR-18
MET-T-CCMS-VA	**Water**							
Batch R3993213								
WG2735741-2 LCS								
Aluminum (Al)-Total			101.7		%		80-120	21-MAR-18
Antimony (Sb)-Total			97.8		%		80-120	21-MAR-18
Arsenic (As)-Total			97.5		%		80-120	21-MAR-18
Barium (Ba)-Total			103.3		%		80-120	21-MAR-18
Bismuth (Bi)-Total			102.2		%		80-120	21-MAR-18
Boron (B)-Total			94.4		%		80-120	21-MAR-18
Cadmium (Cd)-Total			101.1		%		80-120	21-MAR-18
Calcium (Ca)-Total			93.8		%		80-120	21-MAR-18
Chromium (Cr)-Total			97.5		%		80-120	21-MAR-18
Cobalt (Co)-Total			99.3		%		80-120	21-MAR-18
Copper (Cu)-Total			99.5		%		80-120	21-MAR-18
Iron (Fe)-Total			102.4		%		80-120	21-MAR-18
Lead (Pb)-Total			98.9		%		80-120	21-MAR-18
Lithium (Li)-Total			92.6		%		80-120	21-MAR-18
Magnesium (Mg)-Total			101.8		%		80-120	21-MAR-18
Manganese (Mn)-Total			102.0		%		80-120	21-MAR-18
Molybdenum (Mo)-Total			96.2		%		80-120	21-MAR-18
Nickel (Ni)-Total			99.3		%		80-120	21-MAR-18
Potassium (K)-Total			104.7		%		80-120	21-MAR-18
Selenium (Se)-Total			98.3		%		80-120	21-MAR-18
Silicon (Si)-Total			95.3		%		80-120	21-MAR-18
Silver (Ag)-Total			98.4		%		80-120	21-MAR-18
Sodium (Na)-Total			94.4		%		80-120	21-MAR-18
Strontium (Sr)-Total			96.0		%		80-120	21-MAR-18
Thallium (Tl)-Total			96.8		%		80-120	21-MAR-18
Tin (Sn)-Total			96.6		%		80-120	21-MAR-18
Titanium (Ti)-Total			99.7		%		80-120	21-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3993213								
WG2735741-2 LCS								
Uranium (U)-Total			105.0		%		80-120	21-MAR-18
Vanadium (V)-Total			100.7		%		80-120	21-MAR-18
Zinc (Zn)-Total			95.5		%		80-120	21-MAR-18
WG2735741-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	21-MAR-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	21-MAR-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	21-MAR-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	21-MAR-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	21-MAR-18
Boron (B)-Total			<0.010		mg/L		0.01	21-MAR-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	21-MAR-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	21-MAR-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	21-MAR-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	21-MAR-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	21-MAR-18
Iron (Fe)-Total			<0.010		mg/L		0.01	21-MAR-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	21-MAR-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	21-MAR-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	21-MAR-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	21-MAR-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	21-MAR-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	21-MAR-18
Potassium (K)-Total			<0.050		mg/L		0.05	21-MAR-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	21-MAR-18
Silicon (Si)-Total			<0.10		mg/L		0.1	21-MAR-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	21-MAR-18
Sodium (Na)-Total			<0.050		mg/L		0.05	21-MAR-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	21-MAR-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	21-MAR-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	21-MAR-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	21-MAR-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	21-MAR-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	21-MAR-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	21-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Water**							
Batch R3994964								
WG2738930-6 LCS								
Ammonia, Total (as N)			98.9		%		85-115	24-MAR-18
WG2738930-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	24-MAR-18
NO2-L-IC-N-VA	**Water**							
Batch R3992987								
WG2735235-2 LCS								
Nitrite (as N)			99.9		%		90-110	19-MAR-18
WG2735475-2 LCS								
Nitrite (as N)			101.4		%		90-110	19-MAR-18
WG2735235-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	19-MAR-18
WG2735475-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	19-MAR-18
NO3-L-IC-N-VA	**Water**							
Batch R3992987								
WG2735235-2 LCS								
Nitrate (as N)			99.9		%		90-110	19-MAR-18
WG2735475-2 LCS								
Nitrate (as N)			100.1		%		90-110	19-MAR-18
WG2735235-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	19-MAR-18
WG2735475-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	19-MAR-18
ORP-VA	**Water**							
Batch R3987082								
WG2734377-1 CRM		**VA-ORP**						
ORP			221		mV		210-230	16-MAR-18
WG2734377-2 DUP		**L2068735-1**						
ORP		251	248	J	mV	2.4	15	16-MAR-18
P-T-PRES-COL-VA	**Water**							
Batch R3987406								
WG2734701-6 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			101.1		%		80-120	18-MAR-18
WG2734701-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	18-MAR-18
WG2734701-8 MS		**L2068735-1**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-PRES-COL-VA	**Water**							
Batch R3987406								
WG2734701-8 MS		**L2068735-1**						
Phosphorus (P)-Total			N/A	MS-B	%		-	18-MAR-18
PH-PCT-VA	**Water**							
Batch R3990994								
WG2735224-2 CRM		**VA-PH7-BUF**						
pH			6.98		pH		6.9-7.1	20-MAR-18
WG2735309-2 CRM		**VA-PH7-BUF**						
pH			6.97		pH		6.9-7.1	20-MAR-18
PO4-DO-COL-VA	**Water**							
Batch R3987103								
WG2734423-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			96.9		%		80-120	17-MAR-18
WG2734423-14 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			101.0		%		80-120	17-MAR-18
WG2734423-18 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			103.3		%		80-120	17-MAR-18
WG2734423-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			99.8		%		80-120	17-MAR-18
WG2734423-22 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			97.2		%		80-120	17-MAR-18
WG2734423-6 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			101.5		%		80-120	17-MAR-18
WG2734423-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-MAR-18
WG2734423-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-MAR-18
WG2734423-17 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-MAR-18
WG2734423-21 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-MAR-18
WG2734423-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-MAR-18
WG2734423-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-MAR-18
SO4-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-VA	**Water**							
Batch R3992987								
WG2735235-2 LCS								
Sulfate (SO4)			101.0		%		90-110	19-MAR-18
WG2735475-2 LCS								
Sulfate (SO4)			100.9		%		90-110	19-MAR-18
WG2735235-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-MAR-18
WG2735475-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-MAR-18
TDS-LOW-VA	**Water**							
Batch R3990252								
WG2735091-2 LCS								
Total Dissolved Solids			99.2		%		85-115	19-MAR-18
WG2735091-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	19-MAR-18
TKN-F-VA	**Water**							
Batch R3993923								
WG2734822-6 LCS								
Total Kjeldahl Nitrogen			99.4		%		75-125	22-MAR-18
WG2734822-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	22-MAR-18
TSS-LOW-VA	**Water**							
Batch R3987289								
WG2734437-2 LCS								
Total Suspended Solids			105.2		%		85-115	17-MAR-18
WG2734437-1 MB								
Total Suspended Solids			<1.0		mg/L		1	17-MAR-18
TURBIDITY-VA	**Water**							
Batch R3987336								
WG2734522-2 CRM		**VA-FORM-40**						
Turbidity			97.0		%		85-115	17-MAR-18
WG2734522-5 CRM		**VA-FORM-40**						
Turbidity			97.8		%		85-115	17-MAR-18
WG2734522-6 DUP		**L2068735-1**						
Turbidity		8.38	8.77		NTU	4.5	15	17-MAR-18
WG2734522-1 MB								
Turbidity			<0.10		NTU		0.1	17-MAR-18
WG2734522-4 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-VA	**Water**							
Batch R3987336								
WG2734522-4 MB								
Turbidity			<0.10		NTU		0.1	17-MAR-18
Batch R3987477								
WG2734721-2 CRM		**VA-FORM-40**						
Turbidity			101.0		%		85-115	18-MAR-18
WG2734721-5 CRM		**VA-FORM-40**						
Turbidity			100.8		%		85-115	18-MAR-18
WG2734721-1 MB								
Turbidity			<0.10		NTU		0.1	18-MAR-18
WG2734721-4 MB								
Turbidity			<0.10		NTU		0.1	18-MAR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	13-MAR-18 11:45	16-MAR-18 21:30	0.25	82	hours	EHTR-FM
	2	13-MAR-18 10:00	16-MAR-18 21:30	0.25	84	hours	EHTR-FM
Turbidity by Meter							
	1	13-MAR-18 11:45	17-MAR-18 15:45	3	4	days	EHTL
	2	13-MAR-18 10:00	18-MAR-18 15:41	3	5	days	EHTR
pH by Meter (Automated)							
	1	13-MAR-18 11:45	19-MAR-18 09:45	0.25	142	hours	EHTR-FM
	2	13-MAR-18 10:00	19-MAR-18 09:45	0.25	144	hours	EHTR-FM
Anions and Nutrients							
Diss. Orthophosphate in Water by Colour							
	1	13-MAR-18 11:45	17-MAR-18 02:09	3	4	days	EHTL
	2	13-MAR-18 10:00	17-MAR-18 02:10	3	4	days	EHTR
Nitrate in Water by IC (Low Level)							
	1	13-MAR-18 11:45	19-MAR-18 17:39	3	6	days	EHTL
	2	13-MAR-18 10:00	19-MAR-18 17:39	3	6	days	EHTR
Nitrite in Water by IC (Low Level)							
	1	13-MAR-18 11:45	19-MAR-18 17:39	3	6	days	EHTL
	2	13-MAR-18 10:00	19-MAR-18 17:39	3	6	days	EHTR

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2068735 were received on 16-MAR-18 10:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: GH_Q1_GW_1-3868650055-121017_JAN18

TURNAROUND TIME: RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Greenhills Operation			Lab Name	ALS Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jeremy Enns			Lab Contact	Can Dang			Email 1:	Jeremy.Enns@teck.com	X	X	X
Email	Jeremy.Enns@teck.com			Email	Can.Dang@alsglobal.com			Email 2:	Leigh.Stickney@teck.com	X	X	X
Address	P.O. BOX 5000			Address	8081 Lougheed Hwy			Email 3:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number	540380			
Postal Code	V0B1H0	Country	Canada	Postal Code		Country	Canada					
Phone Number	250-865-3341			Phone Number								

SAMPLE DETAILS

L2068735-COFC

ANALYSIS REQUESTED — Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Fil.	PRESERV.	ANALYSIS											
								N	NONE	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-ROUTINE-VA	TECKCOAL-MET-T-VA					
GH_GA-MW-1_WG_2017-10-01_NP	GH_GA-MW-1	WG		3/13/2018	11:45	G	6	N	H2SO4	1	1	1	1	1	1						
GH_POT09_WG_2018-01-01_NP	GH_POT09	WG		3/13/2018	10:00	G	7	N	NONE	1	1	1	1	1	1	1					
		WG				G		N	HCL												
		WG				G		N	NONE												
								N	NONE												
								N	HNO3												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	J.Kropp		HA	10:10 a.m. 3/16 Temp: 9c

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	J.Kropp	Mobile #	250 423 0826
Sampler's Signature	J.Kropp	Date/Time	

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
BOX 5000
ELKFORD BC V0B1H0

Date Received: 17-MAY-18
Report Date: 30-JAN-19 17:45 (MT)
Version: FINAL REV. 2

Client Phone: 250-865-3305

Certificate of Analysis

Lab Work Order #: L2096506

Project P.O. #: VPO00540380
Job Reference: GREENHILLS OPERATIONS
C of C Numbers: GHO_Q2_WG_2018-04-01
Legal Site Desc:

Comments:
30-JAN-2019 Login qualifier SFPL removed due to dissolved samples field filtered.

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2096506-1 GH_MW-ERSC-1_WG_2018-04-01_NP							
Sampled By: CLIENT on 16-MAY-18 @ 10:07							
Matrix: WG							
Miscellaneous Parameters							
Bromide (Br)	<0.050		0.050	mg/L		19-MAY-18	R4052949
Chloride (Cl)	2.03		0.50	mg/L		19-MAY-18	R4052949
Dissolved Organic Carbon	2.20		0.50	mg/L		22-MAY-18	R4055097
Fluoride (F)	0.170		0.020	mg/L		19-MAY-18	R4052949
Nitrate (as N)	1.42		0.0050	mg/L		19-MAY-18	R4052949
Nitrite (as N)	0.0011		0.0010	mg/L		19-MAY-18	R4052949
Sulfate (SO4)	66.8		0.30	mg/L		19-MAY-18	R4052949
Total Kjeldahl Nitrogen	<0.050	TKNI	0.050	mg/L		22-MAY-18	R4052888
Total Organic Carbon	2.13		0.50	mg/L		22-MAY-18	R4055097
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	19-MAY-18	25-MAY-18	R4056343
Dissolved Metals Filtration Location	FIELD					19-MAY-18	R4048147
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	19-MAY-18	24-MAY-18	R4055469
Dissolved Mercury Filtration Location	FIELD					19-MAY-18	R4048150
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					19-MAY-18	R4048147
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	19-MAY-18	25-MAY-18	R4056343
Antimony (Sb)-Dissolved	0.00010		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Arsenic (As)-Dissolved	0.00014		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Barium (Ba)-Dissolved	0.0826		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Boron (B)-Dissolved	<0.010		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Cadmium (Cd)-Dissolved	0.0185		0.0050	ug/L	19-MAY-18	25-MAY-18	R4056343
Calcium (Ca)-Dissolved	66.1		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Chromium (Cr)-Dissolved	0.00021		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	19-MAY-18	25-MAY-18	R4056343
Copper (Cu)-Dissolved	0.00091		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Lithium (Li)-Dissolved	0.0075		0.0010	mg/L	19-MAY-18	25-MAY-18	R4056343
Magnesium (Mg)-Dissolved	22.6		0.10	mg/L	19-MAY-18	25-MAY-18	R4056343
Manganese (Mn)-Dissolved	0.00561		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Molybdenum (Mo)-Dissolved	0.00205		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Nickel (Ni)-Dissolved	0.00073		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Potassium (K)-Dissolved	0.839		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Selenium (Se)-Dissolved	7.47		0.050	ug/L	19-MAY-18	25-MAY-18	R4056343
Silicon (Si)-Dissolved	2.67		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343
Sodium (Na)-Dissolved	3.14		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Strontium (Sr)-Dissolved	0.205		0.00020	mg/L	19-MAY-18	25-MAY-18	R4056343
Thallium (Tl)-Dissolved	0.000014		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Uranium (U)-Dissolved	0.000858		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Zinc (Zn)-Dissolved	0.0011		0.0010	mg/L	19-MAY-18	25-MAY-18	R4056343
Hardness							
Hardness (as CaCO3)	258		0.50	mg/L		25-MAY-18	
Total Metals in Water							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2096506-1 GH_MW-ERSC-1_WG_2018-04-01_NP							
Sampled By: CLIENT on 16-MAY-18 @ 10:07							
Matrix: WG							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		24-MAY-18	R4056403
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		25-MAY-18	R4056167
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0099		0.0030	mg/L		24-MAY-18	R4056403
Antimony (Sb)-Total	0.00011		0.00010	mg/L		24-MAY-18	R4056403
Arsenic (As)-Total	0.00017		0.00010	mg/L		24-MAY-18	R4056403
Barium (Ba)-Total	0.0849		0.00010	mg/L		24-MAY-18	R4056403
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		24-MAY-18	R4056403
Boron (B)-Total	0.010		0.010	mg/L		24-MAY-18	R4056403
Cadmium (Cd)-Total	0.0208		0.0050	ug/L		24-MAY-18	R4056403
Calcium (Ca)-Total	60.4		0.050	mg/L		24-MAY-18	R4056403
Chromium (Cr)-Total	0.00049		0.00010	mg/L		24-MAY-18	R4056403
Cobalt (Co)-Total	<0.10		0.10	ug/L		24-MAY-18	R4056403
Copper (Cu)-Total	0.00106		0.00050	mg/L		24-MAY-18	R4056403
Iron (Fe)-Total	0.038		0.010	mg/L		24-MAY-18	R4056403
Lead (Pb)-Total	<0.000050		0.000050	mg/L		24-MAY-18	R4056403
Lithium (Li)-Total	0.0073		0.0010	mg/L		24-MAY-18	R4056403
Magnesium (Mg)-Total	18.6		0.10	mg/L		24-MAY-18	R4056403
Manganese (Mn)-Total	0.00655		0.00010	mg/L		24-MAY-18	R4056403
Molybdenum (Mo)-Total	0.00214		0.000050	mg/L		24-MAY-18	R4056403
Nickel (Ni)-Total	0.00077		0.00050	mg/L		24-MAY-18	R4056403
Potassium (K)-Total	0.874		0.050	mg/L		24-MAY-18	R4056403
Selenium (Se)-Total	7.71		0.050	ug/L		24-MAY-18	R4056403
Silicon (Si)-Total	2.81		0.10	mg/L		24-MAY-18	R4056403
Silver (Ag)-Total	<0.000010		0.000010	mg/L		24-MAY-18	R4056403
Sodium (Na)-Total	2.86		0.050	mg/L		24-MAY-18	R4056403
Strontium (Sr)-Total	0.202		0.00020	mg/L		24-MAY-18	R4056403
Thallium (Tl)-Total	0.000015		0.000010	mg/L		24-MAY-18	R4056403
Tin (Sn)-Total	<0.00010		0.00010	mg/L		24-MAY-18	R4056403
Titanium (Ti)-Total	<0.010		0.010	mg/L		24-MAY-18	R4056403
Uranium (U)-Total	0.000970		0.000010	mg/L		24-MAY-18	R4056403
Vanadium (V)-Total	<0.00050		0.00050	mg/L		24-MAY-18	R4056403
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		24-MAY-18	R4056403
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	2.2		1.0	mg/L		25-MAY-18	R4056385
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	188		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Total (as CaCO3)	188		1.0	mg/L		24-MAY-18	R4056267
Ammonia, Total (as N)							
Ammonia as N	0.0135		0.0050	mg/L		25-MAY-18	R4056315
Diss. Orthophosphate in Water by Colour							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		18-MAY-18	R4048077
Electrical Conductivity (EC)							
Conductivity (@ 25C)	439		2.0	uS/cm		24-MAY-18	R4056267
Ion Balance Calculation							
Ion Balance	100		-100	%		25-MAY-18	
Ion Balance Calculation							
Cation - Anion Balance	0.0			%		25-MAY-18	

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2096506-1 GH_MW-ERSC-1_WG_2018-04-01_NP							
Sampled By: CLIENT on 16-MAY-18 @ 10:07							
Matrix: WG							
Ion Balance Calculation							
Anion Sum	5.32			meq/L		25-MAY-18	
Cation Sum	5.32			meq/L		25-MAY-18	
Oxidation redution potential by elect.							
ORP	311		-1000	mV		25-MAY-18	R4056365
Total Dissolved Solids							
Total Dissolved Solids	304	DLHC	20	mg/L		23-MAY-18	R4055237
Total P in Water by Colour							
Phosphorus (P)-Total	0.0074		0.0010	mg/L		29-MAY-18	R4061763
Total Suspended Solids							
Total Suspended Solids	2.3		1.0	mg/L		22-MAY-18	R4054052
Turbidity							
Turbidity	0.20		0.10	NTU		18-MAY-18	R4048158
pH							
pH	7.98		0.10	pH		24-MAY-18	R4056267
L2096506-2 GH_GA-MW-3_WG_2018-04-01_NP							
Sampled By: CLIENT on 16-MAY-18 @ 12:35							
Matrix: WG							
Miscellaneous Parameters							
Bromide (Br)	<0.050		0.050	mg/L		19-MAY-18	R4052949
Chloride (Cl)	9.03		0.50	mg/L		19-MAY-18	R4052949
Dissolved Organic Carbon	3.24		0.50	mg/L		22-MAY-18	R4055097
Fluoride (F)	0.174		0.020	mg/L		19-MAY-18	R4052949
Nitrate (as N)	3.48		0.0050	mg/L		19-MAY-18	R4052949
Nitrite (as N)	0.0800		0.0010	mg/L		19-MAY-18	R4052949
Sulfate (SO4)	387		0.30	mg/L		19-MAY-18	R4052949
Total Kjeldahl Nitrogen	0.436		0.050	mg/L		22-MAY-18	R4052888
Total Organic Carbon	2.96		0.50	mg/L		22-MAY-18	R4055097
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	19-MAY-18	25-MAY-18	R4056343
Dissolved Metals Filtration Location	FIELD					19-MAY-18	R4048147
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	19-MAY-18	24-MAY-18	R4055469
Dissolved Mercury Filtration Location	FIELD					19-MAY-18	R4048150
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					19-MAY-18	R4048147
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	19-MAY-18	25-MAY-18	R4056343
Antimony (Sb)-Dissolved	0.00014		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Arsenic (As)-Dissolved	0.00011		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Barium (Ba)-Dissolved	0.0694		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Boron (B)-Dissolved	0.025		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Cadmium (Cd)-Dissolved	0.0164		0.0050	ug/L	19-MAY-18	25-MAY-18	R4056343
Calcium (Ca)-Dissolved	129		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Cobalt (Co)-Dissolved	0.20		0.10	ug/L	19-MAY-18	25-MAY-18	R4056343
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Iron (Fe)-Dissolved	0.099		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Lithium (Li)-Dissolved	0.0211		0.0010	mg/L	19-MAY-18	25-MAY-18	R4056343
Magnesium (Mg)-Dissolved	66.0		0.10	mg/L	19-MAY-18	25-MAY-18	R4056343

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2096506-2 GH_GA-MW-3_WG_2018-04-01_NP							
Sampled By: CLIENT on 16-MAY-18 @ 12:35							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Manganese (Mn)-Dissolved	0.0679		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Molybdenum (Mo)-Dissolved	0.00134		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Nickel (Ni)-Dissolved	0.00261		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Potassium (K)-Dissolved	1.48		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Selenium (Se)-Dissolved	49.2		0.050	ug/L	19-MAY-18	25-MAY-18	R4056343
Silicon (Si)-Dissolved	3.26		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343
Sodium (Na)-Dissolved	8.12		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Strontium (Sr)-Dissolved	0.669		0.00020	mg/L	19-MAY-18	25-MAY-18	R4056343
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Uranium (U)-Dissolved	0.00167		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Zinc (Zn)-Dissolved	0.0063		0.0010	mg/L	19-MAY-18	25-MAY-18	R4056343
Hardness							
Hardness (as CaCO3)	593		0.50	mg/L		25-MAY-18	
Total Metals in Water							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		24-MAY-18	R4056403
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		25-MAY-18	R4056167
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0075		0.0030	mg/L		24-MAY-18	R4056403
Antimony (Sb)-Total	0.00016		0.00010	mg/L		24-MAY-18	R4056403
Arsenic (As)-Total	0.00020		0.00010	mg/L		24-MAY-18	R4056403
Barium (Ba)-Total	0.0710		0.00010	mg/L		24-MAY-18	R4056403
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		24-MAY-18	R4056403
Boron (B)-Total	0.027		0.010	mg/L		24-MAY-18	R4056403
Cadmium (Cd)-Total	0.0210		0.0050	ug/L		24-MAY-18	R4056403
Calcium (Ca)-Total	126		0.050	mg/L		24-MAY-18	R4056403
Chromium (Cr)-Total	0.00016		0.00010	mg/L		24-MAY-18	R4056403
Cobalt (Co)-Total	0.20		0.10	ug/L		24-MAY-18	R4056403
Copper (Cu)-Total	0.00312		0.00050	mg/L		24-MAY-18	R4056403
Iron (Fe)-Total	0.427		0.010	mg/L		24-MAY-18	R4056403
Lead (Pb)-Total	<0.000050		0.000050	mg/L		24-MAY-18	R4056403
Lithium (Li)-Total	0.0199		0.0010	mg/L		24-MAY-18	R4056403
Magnesium (Mg)-Total	56.6		0.10	mg/L		24-MAY-18	R4056403
Manganese (Mn)-Total	0.0640		0.00010	mg/L		24-MAY-18	R4056403
Molybdenum (Mo)-Total	0.00145		0.000050	mg/L		24-MAY-18	R4056403
Nickel (Ni)-Total	0.00256		0.00050	mg/L		24-MAY-18	R4056403
Potassium (K)-Total	1.54		0.050	mg/L		24-MAY-18	R4056403
Selenium (Se)-Total	50.0		0.050	ug/L		24-MAY-18	R4056403
Silicon (Si)-Total	3.43		0.10	mg/L		24-MAY-18	R4056403
Silver (Ag)-Total	<0.000010		0.000010	mg/L		24-MAY-18	R4056403
Sodium (Na)-Total	7.19		0.050	mg/L		24-MAY-18	R4056403
Strontium (Sr)-Total	0.677		0.00020	mg/L		24-MAY-18	R4056403
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		24-MAY-18	R4056403
Tin (Sn)-Total	<0.00010		0.00010	mg/L		24-MAY-18	R4056403
Titanium (Ti)-Total	<0.010		0.010	mg/L		24-MAY-18	R4056403
Uranium (U)-Total	0.00175		0.000010	mg/L		24-MAY-18	R4056403
Vanadium (V)-Total	<0.00050		0.00050	mg/L		24-MAY-18	R4056403

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2096506-2 GH_GA-MW-3_WG_2018-04-01_NP							
Sampled By: CLIENT on 16-MAY-18 @ 12:35							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Zinc (Zn)-Total	0.0069		0.0030	mg/L		24-MAY-18	R4056403
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	4.7		1.0	mg/L		25-MAY-18	R4056385
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	183		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Total (as CaCO3)	183		1.0	mg/L		24-MAY-18	R4056267
Ammonia, Total (as N)							
Ammonia as N	0.0440		0.0050	mg/L		25-MAY-18	R4056315
Diss. Orthophosphate in Water by Colour							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		18-MAY-18	R4048077
Electrical Conductivity (EC)							
Conductivity (@ 25C)	988		2.0	uS/cm		24-MAY-18	R4056267
Ion Balance Calculation							
Ion Balance	100		-100	%		25-MAY-18	
Ion Balance Calculation							
Cation - Anion Balance	0.2			%		25-MAY-18	
Anion Sum	12.2			meq/L		25-MAY-18	
Cation Sum	12.3			meq/L		25-MAY-18	
Oxidation redution potential by elect.							
ORP	319		-1000	mV		25-MAY-18	R4056365
Total Dissolved Solids							
Total Dissolved Solids	764	DLHC	20	mg/L		23-MAY-18	R4055237
Total P in Water by Colour							
Phosphorus (P)-Total	0.0128		0.0010	mg/L		29-MAY-18	R4061763
Total Suspended Solids							
Total Suspended Solids	26.4		1.0	mg/L		23-MAY-18	R4055442
Turbidity							
Turbidity	0.58		0.10	NTU		18-MAY-18	R4048158
pH							
pH	7.81		0.10	pH		24-MAY-18	R4056267
L2096506-3 GH_GWD1_WG_2018-04-01_NP							
Sampled By: CLIENT on 16-MAY-18 @ 12:00							
Matrix: WG							
Miscellaneous Parameters							
Bromide (Br)	<0.050		0.050	mg/L		19-MAY-18	R4052949
Chloride (Cl)	2.03		0.50	mg/L		19-MAY-18	R4052949
Dissolved Organic Carbon	2.09		0.50	mg/L		22-MAY-18	R4055097
Fluoride (F)	0.170		0.020	mg/L		19-MAY-18	R4052949
Nitrate (as N)	1.40		0.0050	mg/L		19-MAY-18	R4052949
Nitrite (as N)	<0.0010		0.0010	mg/L		19-MAY-18	R4052949
Sulfate (SO4)	66.8		0.30	mg/L		19-MAY-18	R4052949
Total Kjeldahl Nitrogen	0.115	TKNI	0.050	mg/L		24-MAY-18	R4052888
Total Organic Carbon	2.33		0.50	mg/L		22-MAY-18	R4055097
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	19-MAY-18	25-MAY-18	R4056343
Dissolved Metals Filtration Location	FIELD					19-MAY-18	R4048147
Diss. Mercury in Water by CVAAS or CVAFS							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2096506-3 GH_GWD1_WG_2018-04-01_NP							
Sampled By: CLIENT on 16-MAY-18 @ 12:00							
Matrix: WG							
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	19-MAY-18	24-MAY-18	R4055469
Dissolved Mercury Filtration Location	FIELD					19-MAY-18	R4048150
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					19-MAY-18	R4048147
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	19-MAY-18	25-MAY-18	R4056343
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Arsenic (As)-Dissolved	0.00013		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Barium (Ba)-Dissolved	0.0816		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Boron (B)-Dissolved	<0.010		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Cadmium (Cd)-Dissolved	0.0219		0.0050	ug/L	19-MAY-18	25-MAY-18	R4056343
Calcium (Ca)-Dissolved	63.1		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Chromium (Cr)-Dissolved	0.00019		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	19-MAY-18	25-MAY-18	R4056343
Copper (Cu)-Dissolved	0.00081		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Lithium (Li)-Dissolved	0.0071		0.0010	mg/L	19-MAY-18	25-MAY-18	R4056343
Magnesium (Mg)-Dissolved	21.9		0.10	mg/L	19-MAY-18	25-MAY-18	R4056343
Manganese (Mn)-Dissolved	0.00527		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Molybdenum (Mo)-Dissolved	0.00210		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Nickel (Ni)-Dissolved	0.00073		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Potassium (K)-Dissolved	0.834		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Selenium (Se)-Dissolved	7.75		0.050	ug/L	19-MAY-18	25-MAY-18	R4056343
Silicon (Si)-Dissolved	2.79		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343
Sodium (Na)-Dissolved	3.05		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Strontium (Sr)-Dissolved	0.192		0.00020	mg/L	19-MAY-18	25-MAY-18	R4056343
Thallium (Tl)-Dissolved	0.000015		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Uranium (U)-Dissolved	0.000871		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	19-MAY-18	25-MAY-18	R4056343
Hardness							
Hardness (as CaCO3)	248		0.50	mg/L		25-MAY-18	
Total Metals in Water							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		24-MAY-18	R4056403
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		25-MAY-18	R4056167
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0075		0.0030	mg/L		24-MAY-18	R4056403
Antimony (Sb)-Total	0.00010		0.00010	mg/L		24-MAY-18	R4056403
Arsenic (As)-Total	0.00016		0.00010	mg/L		24-MAY-18	R4056403
Barium (Ba)-Total	0.0874		0.00010	mg/L		24-MAY-18	R4056403
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		24-MAY-18	R4056403
Boron (B)-Total	0.011		0.010	mg/L		24-MAY-18	R4056403
Cadmium (Cd)-Total	0.0211		0.0050	ug/L		24-MAY-18	R4056403
Calcium (Ca)-Total	62.1		0.050	mg/L		24-MAY-18	R4056403
Chromium (Cr)-Total	0.00022		0.00010	mg/L		24-MAY-18	R4056403
Cobalt (Co)-Total	<0.10		0.10	ug/L		24-MAY-18	R4056403

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2096506-3 GH_GWD1_WG_2018-04-01_NP							
Sampled By: CLIENT on 16-MAY-18 @ 12:00							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Copper (Cu)-Total	0.00098		0.00050	mg/L		24-MAY-18	R4056403
Iron (Fe)-Total	0.021		0.010	mg/L		24-MAY-18	R4056403
Lead (Pb)-Total	<0.000050		0.000050	mg/L		24-MAY-18	R4056403
Lithium (Li)-Total	0.0064		0.0010	mg/L		24-MAY-18	R4056403
Magnesium (Mg)-Total	18.7		0.10	mg/L		24-MAY-18	R4056403
Manganese (Mn)-Total	0.00576		0.00010	mg/L		24-MAY-18	R4056403
Molybdenum (Mo)-Total	0.00244		0.000050	mg/L		24-MAY-18	R4056403
Nickel (Ni)-Total	0.00070		0.00050	mg/L		24-MAY-18	R4056403
Potassium (K)-Total	0.872		0.050	mg/L		24-MAY-18	R4056403
Selenium (Se)-Total	7.78		0.050	ug/L		24-MAY-18	R4056403
Silicon (Si)-Total	2.97		0.10	mg/L		24-MAY-18	R4056403
Silver (Ag)-Total	<0.000010		0.000010	mg/L		24-MAY-18	R4056403
Sodium (Na)-Total	2.78		0.050	mg/L		24-MAY-18	R4056403
Strontium (Sr)-Total	0.198		0.00020	mg/L		24-MAY-18	R4056403
Thallium (Tl)-Total	0.000017		0.000010	mg/L		24-MAY-18	R4056403
Tin (Sn)-Total	<0.00010		0.00010	mg/L		24-MAY-18	R4056403
Titanium (Ti)-Total	<0.010		0.010	mg/L		24-MAY-18	R4056403
Uranium (U)-Total	0.000970		0.000010	mg/L		24-MAY-18	R4056403
Vanadium (V)-Total	<0.00050		0.00050	mg/L		24-MAY-18	R4056403
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		24-MAY-18	R4056403
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	2.2		1.0	mg/L		25-MAY-18	R4056385
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	195		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Total (as CaCO3)	195		1.0	mg/L		24-MAY-18	R4056267
Ammonia, Total (as N)							
Ammonia as N	0.0171		0.0050	mg/L		25-MAY-18	R4056315
Diss. Orthophosphate in Water by Colour							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		18-MAY-18	R4048077
Electrical Conductivity (EC)							
Conductivity (@ 25C)	442		2.0	uS/cm		24-MAY-18	R4056267
Ion Balance Calculation							
Cation - Anion Balance	-3.3			%		25-MAY-18	
Anion Sum	5.45			meq/L		25-MAY-18	
Cation Sum	5.10			meq/L		25-MAY-18	
Ion Balance Calculation							
Ion Balance	93.6		-100	%		25-MAY-18	
Oxidation redution potential by elect.							
ORP	323		-1000	mV		25-MAY-18	R4056365
Total Dissolved Solids							
Total Dissolved Solids	300	DLHC	20	mg/L		23-MAY-18	R4055237
Total P in Water by Colour							
Phosphorus (P)-Total	0.0043		0.0010	mg/L		29-MAY-18	R4061763
Total Suspended Solids							
Total Suspended Solids	1.2		1.0	mg/L		23-MAY-18	R4055442
Turbidity							
Turbidity	0.47		0.10	NTU		19-MAY-18	R4048446
pH							
pH	8.00		0.10	pH		24-MAY-18	R4056267

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2096506-3 GH_GWD1_WG_2018-04-01_NP Sampled By: CLIENT on 16-MAY-18 @ 12:00 Matrix: WG							
L2096506-4 GH_GWB1_WG_2018-04-01_NP Sampled By: CLIENT on 16-MAY-18 @ 12:00 Matrix: WG							
Miscellaneous Parameters							
Bromide (Br)	<0.050		0.050	mg/L		19-MAY-18	R4052949
Chloride (Cl)	<0.50		0.50	mg/L		19-MAY-18	R4052949
Dissolved Organic Carbon	<0.50		0.50	mg/L		22-MAY-18	R4055097
Fluoride (F)	<0.020		0.020	mg/L		19-MAY-18	R4052949
Nitrate (as N)	<0.0050		0.0050	mg/L		19-MAY-18	R4052949
Nitrite (as N)	<0.0010		0.0010	mg/L		19-MAY-18	R4052949
Sulfate (SO4)	<0.30		0.30	mg/L		19-MAY-18	R4052949
Total Kjeldahl Nitrogen	<0.050	RRV	0.050	mg/L		24-MAY-18	R4052888
Total Organic Carbon	<0.50		0.50	mg/L		22-MAY-18	R4055097
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	19-MAY-18	25-MAY-18	R4056343
Dissolved Metals Filtration Location	FIELD					19-MAY-18	R4048147
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	19-MAY-18	24-MAY-18	R4055469
Dissolved Mercury Filtration Location	FIELD					19-MAY-18	R4048150
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					25-MAY-18	R4056441
Dissolved Metals Filtration Location	FIELD					19-MAY-18	R4048147
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	19-MAY-18	25-MAY-18	R4056343
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Barium (Ba)-Dissolved	<0.00010		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Boron (B)-Dissolved	<0.010		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Cadmium (Cd)-Dissolved	<0.0050		0.0050	ug/L	19-MAY-18	25-MAY-18	R4056343
Calcium (Ca)-Dissolved	<0.050		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	25-MAY-18	26-MAY-18	R4056428
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	19-MAY-18	25-MAY-18	R4056343
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Lithium (Li)-Dissolved	<0.0010		0.0010	mg/L	19-MAY-18	25-MAY-18	R4056343
Magnesium (Mg)-Dissolved	<0.10		0.10	mg/L	19-MAY-18	25-MAY-18	R4056343
Manganese (Mn)-Dissolved	<0.00010		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Molybdenum (Mo)-Dissolved	<0.000050		0.000050	mg/L	19-MAY-18	25-MAY-18	R4056343
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Potassium (K)-Dissolved	<0.050		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	19-MAY-18	25-MAY-18	R4056343
Silicon (Si)-Dissolved	<0.050		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343
Sodium (Na)-Dissolved	<0.050		0.050	mg/L	19-MAY-18	25-MAY-18	R4056343
Strontium (Sr)-Dissolved	<0.00020		0.00020	mg/L	19-MAY-18	25-MAY-18	R4056343
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	19-MAY-18	25-MAY-18	R4056343
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	19-MAY-18	25-MAY-18	R4056343
Uranium (U)-Dissolved	<0.000010		0.000010	mg/L	19-MAY-18	25-MAY-18	R4056343

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2096506-4 GH_GWB1_WG_2018-04-01_NP							
Sampled By: CLIENT on 16-MAY-18 @ 12:00							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	19-MAY-18	25-MAY-18	R4056343
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	19-MAY-18	25-MAY-18	R4056343
Hardness							
Hardness (as CaCO3)	<0.50		0.50	mg/L		28-MAY-18	
Total Metals in Water							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		24-MAY-18	R4056403
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		25-MAY-18	R4056167
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		24-MAY-18	R4056403
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		24-MAY-18	R4056403
Arsenic (As)-Total	<0.00010		0.00010	mg/L		24-MAY-18	R4056403
Barium (Ba)-Total	<0.00010		0.00010	mg/L		26-MAY-18	R4057381
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		24-MAY-18	R4056403
Boron (B)-Total	<0.010		0.010	mg/L		24-MAY-18	R4056403
Cadmium (Cd)-Total	<0.0050		0.0050	ug/L		24-MAY-18	R4056403
Calcium (Ca)-Total	<0.050		0.050	mg/L		24-MAY-18	R4056403
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		24-MAY-18	R4056403
Cobalt (Co)-Total	<0.10		0.10	ug/L		24-MAY-18	R4056403
Copper (Cu)-Total	<0.00050		0.00050	mg/L		24-MAY-18	R4056403
Iron (Fe)-Total	<0.010		0.010	mg/L		24-MAY-18	R4056403
Lead (Pb)-Total	<0.000050		0.000050	mg/L		24-MAY-18	R4056403
Lithium (Li)-Total	<0.0010		0.0010	mg/L		24-MAY-18	R4056403
Magnesium (Mg)-Total	<0.10		0.10	mg/L		24-MAY-18	R4056403
Manganese (Mn)-Total	<0.00010		0.00010	mg/L		24-MAY-18	R4056403
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L		24-MAY-18	R4056403
Nickel (Ni)-Total	<0.00050		0.00050	mg/L		24-MAY-18	R4056403
Potassium (K)-Total	<0.050		0.050	mg/L		24-MAY-18	R4056403
Selenium (Se)-Total	<0.050		0.050	ug/L		24-MAY-18	R4056403
Silicon (Si)-Total	<0.10		0.10	mg/L		24-MAY-18	R4056403
Silver (Ag)-Total	<0.000010		0.000010	mg/L		24-MAY-18	R4056403
Sodium (Na)-Total	<0.050		0.050	mg/L		24-MAY-18	R4056403
Strontium (Sr)-Total	<0.00020		0.00020	mg/L		24-MAY-18	R4056403
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		24-MAY-18	R4056403
Tin (Sn)-Total	<0.00010		0.00010	mg/L		24-MAY-18	R4056403
Titanium (Ti)-Total	<0.010		0.010	mg/L		24-MAY-18	R4056403
Uranium (U)-Total	<0.000010		0.000010	mg/L		24-MAY-18	R4056403
Vanadium (V)-Total	<0.00050		0.00050	mg/L		24-MAY-18	R4056403
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		24-MAY-18	R4056403
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	2.0		1.0	mg/L		25-MAY-18	R4056385
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	<1.0		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		24-MAY-18	R4056267
Alkalinity, Total (as CaCO3)	<1.0		1.0	mg/L		24-MAY-18	R4056267
Ammonia, Total (as N)							
Ammonia as N	<0.0050		0.0050	mg/L		25-MAY-18	R4056315
Diss. Orthophosphate in Water by Colour							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		18-MAY-18	R4048077

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2096506-4 GH_GWB1_WG_2018-04-01_NP							
Sampled By: CLIENT on 16-MAY-18 @ 12:00							
Matrix: WG							
Electrical Conductivity (EC)							
Conductivity (@ 25C)	<2.0		2.0	uS/cm		24-MAY-18	R4056267
Ion Balance Calculation							
Ion Balance	0.0		-100	%		28-MAY-18	
Ion Balance Calculation							
Cation - Anion Balance	0.0			%		28-MAY-18	
Anion Sum	<0.10			meq/L		28-MAY-18	
Cation Sum	<0.10			meq/L		28-MAY-18	
Oxidation redution potential by elect.							
ORP	452		-1000	mV		25-MAY-18	R4056365
Total Dissolved Solids							
Total Dissolved Solids	<10		10	mg/L		23-MAY-18	R4055237
Total P in Water by Colour							
Phosphorus (P)-Total	<0.0010		0.0010	mg/L		29-MAY-18	R4061763
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		23-MAY-18	R4055442
Turbidity							
Turbidity	0.20		0.10	NTU		19-MAY-18	R4048446
pH							
pH	5.41		0.10	pH		24-MAY-18	R4056267

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
BR-L-IC-N-ED	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental
This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide. The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC. TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.			
C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide. The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC. TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.			
CL-IC-N-ED	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B
Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.			
F-IC-N-ED	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-ED	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-ED	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-ED	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

GHO_Q2_WG_2018-04-01

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2096506 Report Date: 30-JAN-19

Client: TECK COAL LIMITED (GREENHILLS)
BOX 5000
ELKFORD BC V0B1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4056385								
WG2781150-12 DUP		**L2096506-4**						
Acidity (as CaCO3)		2.0	2.2		mg/L	11	20	25-MAY-18
WG2781150-11 LCS								
Acidity (as CaCO3)			104.8		%		85-115	25-MAY-18
WG2781150-10 MB								
Acidity (as CaCO3)			1.8		mg/L		2	25-MAY-18
ALK-MAN-CL	**Water**							
Batch R4056267								
WG2780975-8 LCS								
Alkalinity, Total (as CaCO3)			104.2		%		85-115	24-MAY-18
WG2780975-7 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	24-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4056213								
WG2776477-2 LCS								
Beryllium (Be)-Dissolved			97.6		%		80-120	25-MAY-18
WG2776477-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	25-MAY-18
Batch R4056343								
WG2776477-4 MS		**L2096506-4**						
Beryllium (Be)-Dissolved			97.6		%		70-130	25-MAY-18
BE-T-L-CCMS-VA	**Water**							
Batch R4056403								
WG2777028-2 LCS								
Beryllium (Be)-Total			102.7		%		80-120	24-MAY-18
WG2777028-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	24-MAY-18
BR-L-IC-N-ED	**Water**							
Batch R4052949								
WG2776643-2 LCS								
Bromide (Br)			101.0		%		85-115	19-MAY-18
WG2776643-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18
C-DIS-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R4055097								
WG2779378-14 LCS								
Dissolved Organic Carbon			101.2		%		80-120	24-MAY-18
WG2779378-13 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	24-MAY-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4055097								
WG2779378-14 LCS								
Total Organic Carbon			100.1		%		80-120	24-MAY-18
WG2779378-13 MB								
Total Organic Carbon			<0.50		mg/L		0.5	24-MAY-18
CL-IC-N-ED	**Water**							
Batch R4052949								
WG2776643-15 LCS								
Chloride (Cl)			102.2		%		90-110	19-MAY-18
WG2776643-17 LCS								
Chloride (Cl)			102.2		%		90-110	19-MAY-18
WG2776643-19 LCS								
Chloride (Cl)			101.9		%		90-110	19-MAY-18
WG2776643-2 LCS								
Chloride (Cl)			102.1		%		90-110	19-MAY-18
WG2776643-21 LCS								
Chloride (Cl)			102.3		%		90-110	20-MAY-18
WG2776643-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-MAY-18
WG2776643-16 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-MAY-18
WG2776643-18 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-MAY-18
WG2776643-20 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-MAY-18
WG2776643-22 MB								
Chloride (Cl)			<0.50		mg/L		0.5	20-MAY-18
EC-L-PCT-CL	**Water**							
Batch R4056267								
WG2780975-8 LCS								
Conductivity (@ 25C)			102.0		%		90-110	24-MAY-18
WG2780975-7 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	24-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-ED	**Water**							
Batch R4052949								
WG2776643-15 LCS								
Fluoride (F)			102.4		%		90-110	19-MAY-18
WG2776643-17 LCS								
Fluoride (F)			104.7		%		90-110	19-MAY-18
WG2776643-19 LCS								
Fluoride (F)			103.7		%		90-110	19-MAY-18
WG2776643-2 LCS								
Fluoride (F)			102.4		%		90-110	19-MAY-18
WG2776643-21 LCS								
Fluoride (F)			102.2		%		90-110	20-MAY-18
WG2776643-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-MAY-18
WG2776643-16 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-MAY-18
WG2776643-18 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-MAY-18
WG2776643-20 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-MAY-18
WG2776643-22 MB								
Fluoride (F)			<0.020		mg/L		0.02	20-MAY-18
HG-D-CVAA-VA	**Water**							
Batch R4051196								
WG2776475-14 LCS								
Mercury (Hg)-Dissolved			103.1		%		80-120	22-MAY-18
HG-T-CVAA-VA	**Water**							
Batch R4056167								
WG2780862-2 LCS								
Mercury (Hg)-Total			88.0		%		80-120	25-MAY-18
WG2780862-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	25-MAY-18
MET-D-CCMS-VA	**Water**							
Batch R4056213								
WG2776477-2 LCS								
Aluminum (Al)-Dissolved			101.2		%		80-120	25-MAY-18
Antimony (Sb)-Dissolved			100.5		%		80-120	25-MAY-18
Arsenic (As)-Dissolved			98.6		%		80-120	25-MAY-18
Barium (Ba)-Dissolved			96.8		%		80-120	25-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4056213								
WG2776477-2 LCS								
Bismuth (Bi)-Dissolved			99.1		%		80-120	25-MAY-18
Boron (B)-Dissolved			85.0		%		80-120	25-MAY-18
Cadmium (Cd)-Dissolved			99.7		%		80-120	25-MAY-18
Calcium (Ca)-Dissolved			91.4		%		80-120	25-MAY-18
Chromium (Cr)-Dissolved			97.1		%		80-120	25-MAY-18
Cobalt (Co)-Dissolved			97.0		%		80-120	25-MAY-18
Copper (Cu)-Dissolved			99.6		%		80-120	25-MAY-18
Iron (Fe)-Dissolved			92.0		%		80-120	25-MAY-18
Lead (Pb)-Dissolved			99.3		%		80-120	25-MAY-18
Lithium (Li)-Dissolved			100.1		%		80-120	25-MAY-18
Magnesium (Mg)-Dissolved			103.1		%		80-120	25-MAY-18
Manganese (Mn)-Dissolved			98.1		%		80-120	25-MAY-18
Molybdenum (Mo)-Dissolved			99.7		%		80-120	25-MAY-18
Nickel (Ni)-Dissolved			100.7		%		80-120	25-MAY-18
Potassium (K)-Dissolved			100.4		%		80-120	25-MAY-18
Selenium (Se)-Dissolved			98.9		%		80-120	25-MAY-18
Silicon (Si)-Dissolved			107.5		%		80-120	25-MAY-18
Silver (Ag)-Dissolved			100.7		%		80-120	25-MAY-18
Sodium (Na)-Dissolved			99.4		%		80-120	25-MAY-18
Strontium (Sr)-Dissolved			107.5		%		80-120	25-MAY-18
Thallium (Tl)-Dissolved			102.6		%		80-120	25-MAY-18
Tin (Sn)-Dissolved			97.8		%		80-120	25-MAY-18
Titanium (Ti)-Dissolved			96.5		%		80-120	25-MAY-18
Uranium (U)-Dissolved			104.1		%		80-120	25-MAY-18
Vanadium (V)-Dissolved			102.2		%		80-120	25-MAY-18
Zinc (Zn)-Dissolved			92.4		%		80-120	25-MAY-18
WG2776477-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	25-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	25-MAY-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	25-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4056213								
WG2776477-1 MB		**NP**						
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	25-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	25-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	25-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	25-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	25-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	25-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	25-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	25-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	25-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	25-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	25-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	25-MAY-18
Batch R4056343								
WG2776477-4 MS		**L2096506-4**						
Aluminum (Al)-Dissolved			98.9		%		70-130	25-MAY-18
Antimony (Sb)-Dissolved			102.4		%		70-130	25-MAY-18
Arsenic (As)-Dissolved			101.0		%		70-130	25-MAY-18
Barium (Ba)-Dissolved			100.1		%		70-130	25-MAY-18
Bismuth (Bi)-Dissolved			93.1		%		70-130	25-MAY-18
Boron (B)-Dissolved			94.5		%		70-130	25-MAY-18
Cadmium (Cd)-Dissolved			103.6		%		70-130	25-MAY-18
Calcium (Ca)-Dissolved			98.0		%		70-130	25-MAY-18
Cobalt (Co)-Dissolved			100.8		%		70-130	25-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4056343								
WG2776477-4 MS		**L2096506-4**						
Copper (Cu)-Dissolved			101.5		%		70-130	25-MAY-18
Iron (Fe)-Dissolved			97.8		%		70-130	25-MAY-18
Lead (Pb)-Dissolved			98.1		%		70-130	25-MAY-18
Lithium (Li)-Dissolved			98.1		%		70-130	25-MAY-18
Magnesium (Mg)-Dissolved			101.8		%		70-130	25-MAY-18
Manganese (Mn)-Dissolved			102.6		%		70-130	25-MAY-18
Molybdenum (Mo)-Dissolved			96.9		%		70-130	25-MAY-18
Nickel (Ni)-Dissolved			99.7		%		70-130	25-MAY-18
Potassium (K)-Dissolved			99.7		%		70-130	25-MAY-18
Selenium (Se)-Dissolved			97.8		%		70-130	25-MAY-18
Silicon (Si)-Dissolved			96.2		%		70-130	25-MAY-18
Silver (Ag)-Dissolved			101.3		%		70-130	25-MAY-18
Sodium (Na)-Dissolved			101.4		%		70-130	25-MAY-18
Strontium (Sr)-Dissolved			96.3		%		70-130	25-MAY-18
Thallium (Tl)-Dissolved			100.2		%		70-130	25-MAY-18
Tin (Sn)-Dissolved			99.0		%		70-130	25-MAY-18
Titanium (Ti)-Dissolved			100.8		%		70-130	25-MAY-18
Uranium (U)-Dissolved			96.3		%		70-130	25-MAY-18
Vanadium (V)-Dissolved			100.9		%		70-130	25-MAY-18
Zinc (Zn)-Dissolved			98.0		%		70-130	25-MAY-18
Batch R4056428								
WG2781204-2 LCS								
Aluminum (Al)-Dissolved			107.8		%		80-120	26-MAY-18
Antimony (Sb)-Dissolved			95.4		%		80-120	26-MAY-18
Arsenic (As)-Dissolved			102.0		%		80-120	26-MAY-18
Barium (Ba)-Dissolved			103.0		%		80-120	26-MAY-18
Bismuth (Bi)-Dissolved			97.8		%		80-120	26-MAY-18
Boron (B)-Dissolved			85.6		%		80-120	26-MAY-18
Cadmium (Cd)-Dissolved			102.2		%		80-120	26-MAY-18
Calcium (Ca)-Dissolved			95.8		%		80-120	26-MAY-18
Chromium (Cr)-Dissolved			102.2		%		80-120	26-MAY-18
Cobalt (Co)-Dissolved			104.4		%		80-120	26-MAY-18
Copper (Cu)-Dissolved			102.4		%		80-120	26-MAY-18
Iron (Fe)-Dissolved			99.4		%		80-120	26-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4056428								
WG2781204-2 LCS								
Lead (Pb)-Dissolved			98.0		%		80-120	26-MAY-18
Lithium (Li)-Dissolved			88.2		%		80-120	26-MAY-18
Magnesium (Mg)-Dissolved			107.8		%		80-120	26-MAY-18
Manganese (Mn)-Dissolved			102.2		%		80-120	26-MAY-18
Molybdenum (Mo)-Dissolved			93.4		%		80-120	26-MAY-18
Nickel (Ni)-Dissolved			105.1		%		80-120	26-MAY-18
Potassium (K)-Dissolved			105.3		%		80-120	26-MAY-18
Selenium (Se)-Dissolved			95.0		%		80-120	26-MAY-18
Silicon (Si)-Dissolved			104.6		%		80-120	26-MAY-18
Silver (Ag)-Dissolved			96.6		%		80-120	26-MAY-18
Sodium (Na)-Dissolved			107.6		%		80-120	26-MAY-18
Strontium (Sr)-Dissolved			106.5		%		80-120	26-MAY-18
Thallium (Tl)-Dissolved			94.5		%		80-120	26-MAY-18
Tin (Sn)-Dissolved			96.3		%		80-120	26-MAY-18
Titanium (Ti)-Dissolved			101.4		%		80-120	26-MAY-18
Uranium (U)-Dissolved			93.0		%		80-120	26-MAY-18
Vanadium (V)-Dissolved			105.9		%		80-120	26-MAY-18
Zinc (Zn)-Dissolved			94.7		%		80-120	26-MAY-18
WG2781204-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	26-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	26-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	26-MAY-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	26-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	26-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	26-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	26-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	26-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	26-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	26-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4056428								
WG2781204-1 MB		**NP**						
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	26-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	26-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	26-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	26-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	26-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	26-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	26-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	26-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	26-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	26-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	26-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	26-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	26-MAY-18
MET-T-CCMS-VA	**Water**							
Batch R4056403								
WG2777028-2 LCS								
Aluminum (Al)-Total			107.0		%		80-120	24-MAY-18
Antimony (Sb)-Total			111.8		%		80-120	24-MAY-18
Arsenic (As)-Total			101.7		%		80-120	24-MAY-18
Barium (Ba)-Total			109.8		%		80-120	24-MAY-18
Bismuth (Bi)-Total			106.4		%		80-120	24-MAY-18
Boron (B)-Total			98.0		%		80-120	24-MAY-18
Cadmium (Cd)-Total			105.5		%		80-120	24-MAY-18
Calcium (Ca)-Total			105.6		%		80-120	24-MAY-18
Chromium (Cr)-Total			100.1		%		80-120	24-MAY-18
Cobalt (Co)-Total			102.1		%		80-120	24-MAY-18
Copper (Cu)-Total			102.7		%		80-120	24-MAY-18
Iron (Fe)-Total			103.2		%		80-120	24-MAY-18
Lead (Pb)-Total			106.7		%		80-120	24-MAY-18
Lithium (Li)-Total			91.0		%		80-120	24-MAY-18
Magnesium (Mg)-Total			96.5		%		80-120	24-MAY-18
Manganese (Mn)-Total			101.9		%		80-120	24-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4056403								
WG2777028-2 LCS								
Molybdenum (Mo)-Total			107.6		%		80-120	24-MAY-18
Nickel (Ni)-Total			101.6		%		80-120	24-MAY-18
Potassium (K)-Total			107.1		%		80-120	24-MAY-18
Selenium (Se)-Total			104.7		%		80-120	24-MAY-18
Silicon (Si)-Total			105.7		%		80-120	24-MAY-18
Silver (Ag)-Total			109.4		%		80-120	24-MAY-18
Sodium (Na)-Total			95.4		%		80-120	24-MAY-18
Strontium (Sr)-Total			109.6		%		80-120	24-MAY-18
Thallium (Tl)-Total			103.6		%		80-120	24-MAY-18
Tin (Sn)-Total			105.3		%		80-120	24-MAY-18
Titanium (Ti)-Total			99.0		%		80-120	24-MAY-18
Uranium (U)-Total			115.0		%		80-120	24-MAY-18
Vanadium (V)-Total			104.9		%		80-120	24-MAY-18
Zinc (Zn)-Total			97.5		%		80-120	24-MAY-18
WG2777028-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	24-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	24-MAY-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	24-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	24-MAY-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	24-MAY-18
Boron (B)-Total			<0.010		mg/L		0.01	24-MAY-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	24-MAY-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	24-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	24-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	24-MAY-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	24-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	24-MAY-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	24-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	24-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	24-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	24-MAY-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	24-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	24-MAY-18
Potassium (K)-Total			<0.050		mg/L		0.05	24-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4056403								
WG2777028-1 MB								
Selenium (Se)-Total			<0.000050		mg/L		0.00005	24-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	24-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	24-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	24-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	24-MAY-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	24-MAY-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	24-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	24-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	24-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	24-MAY-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	24-MAY-18
Batch R4057381								
WG2781207-2 LCS								
Aluminum (Al)-Total			103.6		%		80-120	27-MAY-18
Antimony (Sb)-Total			109.5		%		80-120	27-MAY-18
Arsenic (As)-Total			108.7		%		80-120	27-MAY-18
Barium (Ba)-Total			110.0		%		80-120	27-MAY-18
Bismuth (Bi)-Total			105.3		%		80-120	27-MAY-18
Boron (B)-Total			94.2		%		80-120	27-MAY-18
Cadmium (Cd)-Total			107.7		%		80-120	27-MAY-18
Calcium (Ca)-Total			112.8		%		80-120	27-MAY-18
Chromium (Cr)-Total			107.9		%		80-120	27-MAY-18
Cobalt (Co)-Total			106.1		%		80-120	27-MAY-18
Copper (Cu)-Total			105.5		%		80-120	27-MAY-18
Iron (Fe)-Total			109.3		%		80-120	27-MAY-18
Lead (Pb)-Total			107.1		%		80-120	27-MAY-18
Lithium (Li)-Total			97.4		%		80-120	27-MAY-18
Magnesium (Mg)-Total			108.8		%		80-120	27-MAY-18
Manganese (Mn)-Total			105.3		%		80-120	27-MAY-18
Molybdenum (Mo)-Total			108.8		%		80-120	27-MAY-18
Nickel (Ni)-Total			108.4		%		80-120	27-MAY-18
Potassium (K)-Total			104.9		%		80-120	27-MAY-18
Selenium (Se)-Total			106.2		%		80-120	27-MAY-18
Silicon (Si)-Total			105.1		%		80-120	27-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4057381								
WG2781207-2 LCS								
Silver (Ag)-Total			109.5		%		80-120	27-MAY-18
Sodium (Na)-Total			105.4		%		80-120	27-MAY-18
Thallium (Tl)-Total			104.2		%		80-120	27-MAY-18
Tin (Sn)-Total			106.2		%		80-120	27-MAY-18
Titanium (Ti)-Total			103.1		%		80-120	27-MAY-18
Uranium (U)-Total			106.4		%		80-120	27-MAY-18
Vanadium (V)-Total			108.8		%		80-120	27-MAY-18
Zinc (Zn)-Total			106.3		%		80-120	27-MAY-18
WG2781207-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	27-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	27-MAY-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	27-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	27-MAY-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	27-MAY-18
Boron (B)-Total			<0.010		mg/L		0.01	27-MAY-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	27-MAY-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	27-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	27-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	27-MAY-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	27-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	27-MAY-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	27-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	27-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	27-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	27-MAY-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	27-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	27-MAY-18
Potassium (K)-Total			<0.050		mg/L		0.05	27-MAY-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	27-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	27-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	27-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	27-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	27-MAY-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	27-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4057381								
WG2781207-1 MB								
Tin (Sn)-Total			<0.00010		mg/L		0.0001	27-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	27-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	27-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	27-MAY-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	27-MAY-18
Batch R4057430								
WG2781207-2 LCS								
Strontium (Sr)-Total			113.6		%		80-120	27-MAY-18
NH3-L-F-CL	**Water**							
Batch R4056315								
WG2781032-10 LCS								
Ammonia as N			106.0		%		85-115	25-MAY-18
WG2781032-9 MB								
Ammonia as N			<0.0050		mg/L		0.005	25-MAY-18
NO2-L-IC-N-ED	**Water**							
Batch R4052949								
WG2776643-15 LCS								
Nitrite (as N)			105.4		%		90-110	19-MAY-18
WG2776643-17 LCS								
Nitrite (as N)			105.1		%		90-110	19-MAY-18
WG2776643-19 LCS								
Nitrite (as N)			105.0		%		90-110	19-MAY-18
WG2776643-2 LCS								
Nitrite (as N)			104.5		%		90-110	19-MAY-18
WG2776643-21 LCS								
Nitrite (as N)			105.4		%		90-110	20-MAY-18
WG2776643-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	19-MAY-18
WG2776643-16 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	19-MAY-18
WG2776643-18 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	19-MAY-18
WG2776643-20 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	19-MAY-18
WG2776643-22 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	20-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-ED	**Water**							
Batch R4052949								
WG2776643-15 LCS								
Nitrate (as N)			102.2		%		90-110	19-MAY-18
WG2776643-17 LCS								
Nitrate (as N)			102.3		%		90-110	19-MAY-18
WG2776643-19 LCS								
Nitrate (as N)			100.8		%		90-110	19-MAY-18
WG2776643-2 LCS								
Nitrate (as N)			102.2		%		90-110	19-MAY-18
WG2776643-21 LCS								
Nitrate (as N)			101.1		%		90-110	20-MAY-18
WG2776643-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	19-MAY-18
WG2776643-16 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	19-MAY-18
WG2776643-18 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	19-MAY-18
WG2776643-20 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	19-MAY-18
WG2776643-22 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	20-MAY-18
ORP-CL	**Water**							
Batch R4056365								
WG2781106-10 CRM		**CL-ORP**						
ORP			229		mV		210-230	25-MAY-18
WG2781106-11 CRM		**CL-ORP**						
ORP			224		mV		210-230	25-MAY-18
P-T-L-COL-ED	**Water**							
Batch R4061763								
WG2783267-10 LCS								
Phosphorus (P)-Total			105.4		%		80-120	29-MAY-18
WG2783267-12 LCS								
Phosphorus (P)-Total			105.6		%		80-120	29-MAY-18
WG2783267-2 LCS								
Phosphorus (P)-Total			106.0		%		80-120	29-MAY-18
WG2783267-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	29-MAY-18
WG2783267-11 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	29-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-ED	**Water**							
Batch R4061763								
WG2783267-9 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	29-MAY-18
PH-CL	**Water**							
Batch R4056267								
WG2780975-8 LCS								
pH			7.03		pH		6.9-7.1	24-MAY-18
PO4-DO-L-COL-ED	**Water**							
Batch R4048077								
WG2775864-10 LCS								
Orthophosphate-Dissolved (as P)			94.6		%		80-120	18-MAY-18
WG2775864-14 LCS								
Orthophosphate-Dissolved (as P)			96.4		%		80-120	18-MAY-18
WG2775864-18 LCS								
Orthophosphate-Dissolved (as P)			96.6		%		80-120	18-MAY-18
WG2775864-2 LCS								
Orthophosphate-Dissolved (as P)			91.4		%		80-120	18-MAY-18
WG2775864-6 LCS								
Orthophosphate-Dissolved (as P)			95.8		%		80-120	18-MAY-18
WG2775864-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-17 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
SO4-IC-N-ED	**Water**							
Batch R4052949								
WG2776643-15 LCS								
Sulfate (SO4)			103.1		%		90-110	19-MAY-18
WG2776643-17 LCS								
Sulfate (SO4)			102.0		%		90-110	19-MAY-18
WG2776643-19 LCS								
Sulfate (SO4)			103.0		%		90-110	19-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-ED	**Water**							
Batch R4052949								
WG2776643-2 LCS								
Sulfate (SO4)			103.0		%		90-110	19-MAY-18
WG2776643-21 LCS								
Sulfate (SO4)			103.4		%		90-110	20-MAY-18
WG2776643-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-MAY-18
WG2776643-16 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-MAY-18
WG2776643-18 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-MAY-18
WG2776643-20 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-MAY-18
WG2776643-22 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	20-MAY-18
SOLIDS-TDS-CL	**Water**							
Batch R4055237								
WG2778321-5 LCS								
Total Dissolved Solids			96.6		%		85-115	23-MAY-18
WG2778321-4 MB								
Total Dissolved Solids			<10		mg/L		10	23-MAY-18
TKN-L-F-CL	**Water**							
Batch R4052888								
WG2778478-10 LCS								
Total Kjeldahl Nitrogen			82.8		%		75-125	22-MAY-18
WG2778478-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	22-MAY-18
TSS-L-CL	**Water**							
Batch R4054052								
WG2777970-11 LCS								
Total Suspended Solids			97.6		%		85-115	22-MAY-18
WG2777970-10 MB								
Total Suspended Solids			<1.0		mg/L		1	22-MAY-18
Batch R4055442								
WG2779027-2 LCS								
Total Suspended Solids			91.1		%		85-115	23-MAY-18
WG2779027-5 LCS								
Total Suspended Solids			99.6		%		85-115	23-MAY-18
WG2779027-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-L-CL	**Water**							
Batch R4055442								
WG2779027-1 MB								
Total Suspended Solids			<1.0		mg/L		1	23-MAY-18
WG2779027-4 MB								
Total Suspended Solids			<1.0		mg/L		1	23-MAY-18
TURBIDITY-CL	**Water**							
Batch R4048158								
WG2776348-11 LCS								
Turbidity			99.5		%		85-115	18-MAY-18
WG2776348-10 MB								
Turbidity			<0.10		NTU		0.1	18-MAY-18
Batch R4048446								
WG2776827-2 LCS								
Turbidity			98.0		%		85-115	19-MAY-18
WG2776827-1 MB								
Turbidity			<0.10		NTU		0.1	19-MAY-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	16-MAY-18 10:07	24-MAY-18 16:00	0.25	198	hours	EHTR-FM
	2	16-MAY-18 12:35	24-MAY-18 16:00	0.25	195	hours	EHTR-FM
	3	16-MAY-18 12:00	24-MAY-18 16:00	0.25	196	hours	EHTR-FM
	4	16-MAY-18 12:00	24-MAY-18 16:00	0.25	196	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2096506 were received on 17-MAY-18 08:50.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

Page 1 of

L2096506-COFC

COC ID:	GHO_Q2_WG_2018-04-01	TURNAROUND TIM		H:

PROJECT/CLIENT INFO				LAB				ER INFO:			
Facility Name / Job#	Greenhills Operation			Lab Name	ALS C			tion	Excel	PDF	EDD
Project Manager	Jeremy Enns			Lab Contact	Lyudmyla Shvets			Email 1:	Jeremy.Enns@teck.com	X	X	X
Email	Jeremy.Enns@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	Leigh.Stickney@teck.com	X	X	X
Address	P.O. BOX 5000			Address	2559 29 Street NE			Email 3:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Calgary	Province	AB	PO number	540380			
Postal Code	V0B1H0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada					
Phone Number	250-865-3341			Phone Number	403 407 1794							

SAMPLE DETAILS								ANALYSIS REQUESTED												Filtered : F: Field, L: Lab, FL: Field & Lab, N: None
								FIL	N	N	N		N	N	N					
								PRESERV	NONE	H2SO4	NONE	HCL	NONE	NONE	HNO3					
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-ROUTINE VA	TECKCOAL-MET-T-VA					
1 GH_MW-ERSC-1_WG_2018-04-01_NP	GH_MW-ERSC-1	WG		5/16/2018	10:07	G	6		1	1	1	1	1	1						
2 GH_GA-MW-3_WG_2018-04-01_NP	GH_GA-MW-3	WG		5/16/2018	12:35	G	6		1	1	1	1	1	1						
3 GH_GWD1_WG_2018-04-01_NP	GH_GWD1	WG		5/16/2018	0:00	G	6		1	1	1	1	1	1						
4 GH_GWB1_WG_2018-04-01_NP	GH_GWB1	WG		5/16/2018	0:00	G	6		1	1	1	1	1	1						

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
				5/17 8:5

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
P.O. Box 5000
Elkford BC V0B 1H0

Date Received: 06-JUN-18
Report Date: 15-JUN-18 15:57 (MT)
Version: FINAL

Client Phone: 250-865-3284

Certificate of Analysis

Lab Work Order #: L2106800

Project P.O. #: 540380
Job Reference: GREENHILLS OPERATION
C of C Numbers: GHO_Q2_WG_2018-04-01
Legal Site Desc:

Comments:
8-JUN-2018 .

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2106800-1	L2106800-2	L2106800-3	L2106800-4	
	Description	WG	WG	WG	WG	
	Sampled Date	04-JUN-18	04-JUN-18	04-JUN-18	04-JUN-18	
	Sampled Time	12:30	14:00			
	Client ID	GH_POTW17_WG_2018-04-01_NP	GH_POTW09_WG_2018-04-01_NP	GH_GWD2_WG_2018-04-01_NP	GH_GWB2_WG_2018-04-01_NP	
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	1320	775	1320	<2.0	
	Hardness (as CaCO3) (mg/L)	763	383	765	<0.50	
	pH (pH)	7.90	7.94	7.87	5.35	
	ORP (mV)	308	359	369	318	
	Total Suspended Solids (mg/L)	3.1	1.4	3.6	<1.0	
	Total Dissolved Solids (mg/L)	1070	512	1050	<3.0	
	Turbidity (NTU)	4.93	1.26	3.80	<0.10	
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	14.0	9.6	14.5	1.4	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	280	248	278	<1.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	280	248	278	<1.0	
	Ammonia, Total (as N) (mg/L)	0.0127	0.0220	0.0129	<0.0050	
	Bromide (Br) (mg/L)	<0.25 DLDS	<0.25 DLDS	<0.25 DLDS	<0.050	
	Chloride (Cl) (mg/L)	17.9	8.56	18.4	<0.10	
	Fluoride (F) (mg/L)	0.18	0.90	0.18	<0.020	
	Nitrate (as N) (mg/L)	0.563	0.027	0.582	<0.0050	
	Nitrite (as N) (mg/L)	<0.0050 DLDS	<0.0050 DLDS	<0.0050 DLDS	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.174	<0.050	0.192	<0.050	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.0054	<0.0020	0.0039	<0.0020	
	Sulfate (SO4) (mg/L)	476	177	492	<0.30	
	Anion Sum (meq/L)	16.1	8.94	16.4	<0.10	
	Cation Sum (meq/L)	15.7	7.96	15.7	<0.10	
	Cation - Anion Balance (%)	-1.2	-5.8	-2.2	0.0	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.97	0.75 SFP	0.98	<0.50	
	Total Organic Carbon (mg/L)	1.10	0.87 SP	1.07	<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0120	<0.0030	0.0134	<0.0030	
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Total (mg/L)	0.00022	0.00057	0.00025	<0.00010	
	Barium (Ba)-Total (mg/L)	0.0298	0.0337	0.0305	<0.00010	
	Beryllium (Be)-Total (ug/L)	<0.020	<0.020	<0.020	<0.020	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	0.020	0.018	0.020	<0.010	
	Cadmium (Cd)-Total (ug/L)	0.0541	0.0082	0.0480	<0.0050	
	Calcium (Ca)-Total (mg/L)	174	96.7	175	<0.050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2106800-1	L2106800-2	L2106800-3	L2106800-4	
	Description	WG	WG	WG	WG	
	Sampled Date	04-JUN-18	04-JUN-18	04-JUN-18	04-JUN-18	
	Sampled Time	12:30	14:00			
	Client ID	GH_POTW17_WG_2018-04-01_NP	GH_POTW09_WG_2018-04-01_NP	GH_GWD2_WG_2018-04-01_NP	GH_GWB2_WG_2018-04-01_NP	
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00037	<0.00010	0.00058	<0.00010	
	Cobalt (Co)-Total (ug/L)	0.17	0.19	0.19	<0.10	
	Copper (Cu)-Total (mg/L)	0.00639	0.0107	0.00642	<0.00050	
	Iron (Fe)-Total (mg/L)	0.647	0.242	0.684	<0.010	
	Lead (Pb)-Total (mg/L)	0.000653	0.000368	0.000627	<0.000050	
	Lithium (Li)-Total (mg/L)	0.0129	0.0112	0.0132	<0.0010	
	Magnesium (Mg)-Total (mg/L)	75.7	41.9	77.3	<0.10	
	Manganese (Mn)-Total (mg/L)	0.0732	0.189	0.0750	<0.00010	
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Total (mg/L)	0.00111	0.00253	0.00110	<0.000050	
	Nickel (Ni)-Total (mg/L)	0.0337	0.00352	0.0195	<0.00050	
	Potassium (K)-Total (mg/L)	1.65	1.61	1.66	<0.050	
	Selenium (Se)-Total (ug/L)	11.0	1.60	11.2	<0.050	
	Silicon (Si)-Total (mg/L)	4.49	4.82	4.51	<0.10	
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	8.39	6.87	8.49	<0.050	
	Strontium (Sr)-Total (mg/L)	0.466	0.333	0.464	<0.00020	
	Thallium (Tl)-Total (mg/L)	0.000013	0.000018	0.000015	<0.000010	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Total (mg/L)	0.00250	0.00224	0.00251	<0.000010	
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Total (mg/L)	0.0073	0.0064	0.0057	<0.0030	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	LAB	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	0.00014	0.00039	0.00017	<0.00010	
	Barium (Ba)-Dissolved (mg/L)	0.0312	0.0306	0.0302	<0.00010	
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)	0.021	0.017	0.022	<0.010	
	Cadmium (Cd)-Dissolved (ug/L)	0.0444	0.0104	0.0436	<0.0050	
	Calcium (Ca)-Dissolved (mg/L)	175	90.4	182	<0.050	
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (ug/L)	0.17	0.16	0.14	<0.10	
	Copper (Cu)-Dissolved (mg/L)	0.00182	0.00273	<0.00050	<0.00050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2106800-1	L2106800-2	L2106800-3	L2106800-4	
Description	WG	WG	WG	WG	
Sampled Date	04-JUN-18	04-JUN-18	04-JUN-18	04-JUN-18	
Sampled Time	12:30	14:00			
Client ID	GH_POTW17_WG_2018-04-01_NP	GH_POTW09_WG_2018-04-01_NP	GH_GWD2_WG_2018-04-01_NP	GH_GWB2_WG_2018-04-01_NP	
Grouping	**Analyte**				
WATER					
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010	0.136	0.152	<0.010	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000059	0.000343	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	0.0131	0.0108	0.0133	<0.0010	
	Magnesium (Mg)-Dissolved (mg/L)	79.4	38.1	75.0	<0.10	
	Manganese (Mn)-Dissolved (mg/L)	0.0695	0.176	0.0639	<0.00010	
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)	0.00110	0.00232	0.00105	<0.000050	
	Nickel (Ni)-Dissolved (mg/L)	0.0333	0.00188	0.0172	<0.00050	
	Potassium (K)-Dissolved (mg/L)	1.69	1.41	1.64	<0.050	
	Selenium (Se)-Dissolved (ug/L)	13.2	1.69	13.5	<0.050	
	Silicon (Si)-Dissolved (mg/L)	4.52	4.17	4.31	<0.050	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	8.56	6.09	8.06	<0.050	
	Strontium (Sr)-Dissolved (mg/L)	0.462	0.302	0.455	<0.00020	
	Thallium (Tl)-Dissolved (mg/L)	0.000015	0.000017	0.000013	<0.000010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	0.00242	0.00214	0.00235	<0.000010	
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Dissolved (mg/L)	0.0043	0.0043	0.0019	<0.0010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L2106800-1, -2, -3, -4
Matrix Spike	Total Organic Carbon	MS-B	L2106800-1, -2, -3, -4
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2106800-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2106800-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2106800-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2106800-1
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2106800-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2106800-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2106800-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2106800-1, -3, -4
Matrix Spike	Calcium (Ca)-Total	MS-B	L2106800-1, -3, -4
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2106800-1, -3, -4
Matrix Spike	Sodium (Na)-Total	MS-B	L2106800-1, -3, -4
Matrix Spike	Strontium (Sr)-Total	MS-B	L2106800-1, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SFP	Sample was Filtered and Preserved at the laboratory
SP	Sample was Preserved at the laboratory

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

Reference Information

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

Reference Information

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GHO_Q2_WG_2018-04-01

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2106800 Report Date: 15-JUN-18

Client: TECK COAL LIMITED (GREENHILLS)
P.O. Box 5000
Elkford BC V0B 1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4074963								
WG2789553-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			106.2		%		85-115	06-JUN-18
WG2789553-1 MB								
Acidity (as CaCO3)			<1.0		mg/L		2	06-JUN-18
ALK-TITR-VA	**Water**							
Batch R4072729								
WG2790070-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			98.4		%		85-115	06-JUN-18
WG2790070-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	06-JUN-18
BE-D-L-CCMS-VA	**Water**							
Batch R4074940								
WG2790495-2 LCS								
Beryllium (Be)-Dissolved			98.0		%		80-120	06-JUN-18
WG2790495-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	06-JUN-18
WG2790495-4 MS		**L2106800-4**						
Beryllium (Be)-Dissolved			93.8		%		70-130	06-JUN-18
Batch R4075411								
WG2791207-3 DUP		**L2106800-1**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	07-JUN-18
WG2791207-2 LCS								
Beryllium (Be)-Dissolved			103.1		%		80-120	07-JUN-18
WG2791207-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	07-JUN-18
Batch R4083779								
WG2798162-3 DUP		**L2106800-2**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	15-JUN-18
WG2798162-2 LCS								
Beryllium (Be)-Dissolved			99.8		%		80-120	15-JUN-18
WG2798162-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	15-JUN-18
BE-T-L-CCMS-VA	**Water**							
Batch R4075027								
WG2790494-2 LCS								
Beryllium (Be)-Total			103.9		%		80-120	06-JUN-18
WG2790494-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	06-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BE-T-L-CCMS-VA	**Water**							
Batch R4081327								
WG2794591-3 DUP		**L2106800-2**						
Beryllium (Be)-Total		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	12-JUN-18
WG2794591-2 LCS								
Beryllium (Be)-Total			102.5		%		80-120	12-JUN-18
WG2794591-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	12-JUN-18
BR-L-IC-N-VA	**Water**							
Batch R4075448								
WG2790591-7 DUP		**L2106800-1**						
Bromide (Br)		<0.25	<0.25	RPD-NA	mg/L	N/A	20	06-JUN-18
WG2790591-6 LCS								
Bromide (Br)			101.5		%		85-115	06-JUN-18
WG2790591-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	06-JUN-18
CARBONS-DOC-VA	**Water**							
Batch R4075516								
WG2790334-5 DUP		**L2106800-1**						
Dissolved Organic Carbon		0.97	0.93		mg/L	4.4	20	06-JUN-18
WG2790334-12 LCS								
Dissolved Organic Carbon			102.4		%		80-120	06-JUN-18
WG2790334-4 LCS								
Dissolved Organic Carbon			102.1		%		80-120	06-JUN-18
WG2790334-8 LCS								
Dissolved Organic Carbon			102.7		%		80-120	06-JUN-18
WG2790334-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	06-JUN-18
WG2790334-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	06-JUN-18
WG2790334-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	06-JUN-18
WG2790334-6 MS		**L2106800-2**						
Dissolved Organic Carbon			102.6		%		70-130	06-JUN-18
CARBONS-TOC-VA	**Water**							
Batch R4075514								
WG2790333-6 DUP		**L2106800-1**						
Total Organic Carbon		1.10	1.08		mg/L	1.4	20	06-JUN-18
WG2790333-13 LCS								
Total Organic Carbon			106.6		%		80-120	06-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-TOC-VA	**Water**							
Batch R4075514								
WG2790333-17 LCS								
Total Organic Carbon			105.6		%		80-120	06-JUN-18
WG2790333-5 LCS								
Total Organic Carbon			102.8		%		80-120	06-JUN-18
WG2790333-9 LCS								
Total Organic Carbon			106.4		%		80-120	06-JUN-18
WG2790333-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	06-JUN-18
WG2790333-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	06-JUN-18
WG2790333-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	06-JUN-18
WG2790333-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	06-JUN-18
WG2790333-7 MS		**L2106800-2**						
Total Organic Carbon			97.5		%		70-130	06-JUN-18
CL-L-IC-N-VA	**Water**							
Batch R4075448								
WG2790591-7 DUP		**L2106800-1**						
Chloride (Cl)		17.9	18.6		mg/L	3.3	20	06-JUN-18
WG2790591-6 LCS								
Chloride (Cl)			101.7		%		90-110	06-JUN-18
WG2790591-5 MB								
Chloride (Cl)			<0.10		mg/L		0.1	06-JUN-18
F-IC-N-VA	**Water**							
Batch R4075448								
WG2790591-7 DUP		**L2106800-1**						
Fluoride (F)		0.18	0.18		mg/L	2.0	20	06-JUN-18
WG2790591-6 LCS								
Fluoride (F)			106.4		%		90-110	06-JUN-18
WG2790591-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	06-JUN-18
HG-D-CVAA-VA	**Water**							
Batch R4081310								
WG2790845-6 LCS								
Mercury (Hg)-Dissolved			102.9		%		80-120	12-JUN-18
WG2790845-5 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	12-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-VA	**Water**							
Batch R4075087								
WG2791096-7 DUP		**L2106800-2**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	07-JUN-18
WG2791096-2 LCS								
Mercury (Hg)-Total			99.5		%		80-120	07-JUN-18
WG2791096-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	07-JUN-18
MET-D-CCMS-VA	**Water**							
Batch R4074940								
WG2790495-2 LCS								
Aluminum (Al)-Dissolved			96.7		%		80-120	06-JUN-18
Antimony (Sb)-Dissolved			96.8		%		80-120	06-JUN-18
Arsenic (As)-Dissolved			97.7		%		80-120	06-JUN-18
Barium (Ba)-Dissolved			99.5		%		80-120	06-JUN-18
Bismuth (Bi)-Dissolved			98.7		%		80-120	06-JUN-18
Boron (B)-Dissolved			98.5		%		80-120	06-JUN-18
Cadmium (Cd)-Dissolved			97.5		%		80-120	06-JUN-18
Calcium (Ca)-Dissolved			99.8		%		80-120	06-JUN-18
Chromium (Cr)-Dissolved			95.1		%		80-120	06-JUN-18
Cobalt (Co)-Dissolved			96.3		%		80-120	06-JUN-18
Copper (Cu)-Dissolved			93.8		%		80-120	06-JUN-18
Iron (Fe)-Dissolved			96.5		%		80-120	06-JUN-18
Lead (Pb)-Dissolved			98.6		%		80-120	06-JUN-18
Lithium (Li)-Dissolved			98.3		%		80-120	06-JUN-18
Magnesium (Mg)-Dissolved			97.2		%		80-120	06-JUN-18
Manganese (Mn)-Dissolved			95.4		%		80-120	06-JUN-18
Molybdenum (Mo)-Dissolved			102.0		%		80-120	06-JUN-18
Nickel (Ni)-Dissolved			95.2		%		80-120	06-JUN-18
Potassium (K)-Dissolved			98.6		%		80-120	06-JUN-18
Selenium (Se)-Dissolved			97.0		%		80-120	06-JUN-18
Silicon (Si)-Dissolved			95.4		%		80-120	06-JUN-18
Silver (Ag)-Dissolved			97.0		%		80-120	06-JUN-18
Sodium (Na)-Dissolved			97.7		%		80-120	06-JUN-18
Strontium (Sr)-Dissolved			99.8		%		80-120	06-JUN-18
Thallium (Tl)-Dissolved			98.6		%		80-120	06-JUN-18
Tin (Sn)-Dissolved			96.6		%		80-120	06-JUN-18
Titanium (Ti)-Dissolved			93.8		%		80-120	06-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4074940								
WG2790495-2 LCS								
Uranium (U)-Dissolved			102.8		%		80-120	06-JUN-18
Vanadium (V)-Dissolved			96.3		%		80-120	06-JUN-18
Zinc (Zn)-Dissolved			100.5		%		80-120	06-JUN-18
WG2790495-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	06-JUN-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	06-JUN-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	06-JUN-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	06-JUN-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	06-JUN-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	06-JUN-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	06-JUN-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	06-JUN-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	06-JUN-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	06-JUN-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	06-JUN-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	06-JUN-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	06-JUN-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	06-JUN-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	06-JUN-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	06-JUN-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	06-JUN-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	06-JUN-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	06-JUN-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	06-JUN-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	06-JUN-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	06-JUN-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	06-JUN-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	06-JUN-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	06-JUN-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	06-JUN-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	06-JUN-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	06-JUN-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	06-JUN-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	06-JUN-18
WG2790495-4 MS		**L2106800-4**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4074940								
WG2790495-4 MS		**L2106800-4**						
Aluminum (Al)-Dissolved			94.6		%		70-130	06-JUN-18
Antimony (Sb)-Dissolved			97.9		%		70-130	06-JUN-18
Arsenic (As)-Dissolved			97.8		%		70-130	06-JUN-18
Barium (Ba)-Dissolved			97.4		%		70-130	06-JUN-18
Bismuth (Bi)-Dissolved			90.9		%		70-130	06-JUN-18
Boron (B)-Dissolved			94.1		%		70-130	06-JUN-18
Cadmium (Cd)-Dissolved			99.7		%		70-130	06-JUN-18
Calcium (Ca)-Dissolved			93.7		%		70-130	06-JUN-18
Chromium (Cr)-Dissolved			94.7		%		70-130	06-JUN-18
Cobalt (Co)-Dissolved			97.6		%		70-130	06-JUN-18
Copper (Cu)-Dissolved			97.0		%		70-130	06-JUN-18
Iron (Fe)-Dissolved			94.8		%		70-130	06-JUN-18
Lead (Pb)-Dissolved			95.8		%		70-130	06-JUN-18
Lithium (Li)-Dissolved			92.8		%		70-130	06-JUN-18
Magnesium (Mg)-Dissolved			97.3		%		70-130	06-JUN-18
Manganese (Mn)-Dissolved			92.3		%		70-130	06-JUN-18
Molybdenum (Mo)-Dissolved			96.4		%		70-130	06-JUN-18
Nickel (Ni)-Dissolved			96.3		%		70-130	06-JUN-18
Potassium (K)-Dissolved			96.6		%		70-130	06-JUN-18
Selenium (Se)-Dissolved			99.4		%		70-130	06-JUN-18
Silicon (Si)-Dissolved			88.5		%		70-130	06-JUN-18
Silver (Ag)-Dissolved			97.5		%		70-130	06-JUN-18
Sodium (Na)-Dissolved			98.4		%		70-130	06-JUN-18
Strontium (Sr)-Dissolved			95.8		%		70-130	06-JUN-18
Thallium (Tl)-Dissolved			96.4		%		70-130	06-JUN-18
Tin (Sn)-Dissolved			94.3		%		70-130	06-JUN-18
Titanium (Ti)-Dissolved			92.3		%		70-130	06-JUN-18
Uranium (U)-Dissolved			98.0		%		70-130	06-JUN-18
Vanadium (V)-Dissolved			93.3		%		70-130	06-JUN-18
Zinc (Zn)-Dissolved			102.7		%		70-130	06-JUN-18
Batch R4075411								
WG2791207-3 DUP		**L2106800-1**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	07-JUN-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	07-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4075411								
WG2791207-3 DUP		**L2106800-1**						
Arsenic (As)-Dissolved		0.00014	0.00012		mg/L	13	20	07-JUN-18
Barium (Ba)-Dissolved		0.0312	0.0315		mg/L	1.1	20	07-JUN-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	07-JUN-18
Boron (B)-Dissolved		0.021	0.021		mg/L	0.3	20	07-JUN-18
Cadmium (Cd)-Dissolved		0.0000444	0.0000466		mg/L	4.8	20	07-JUN-18
Calcium (Ca)-Dissolved		175	175		mg/L	0.1	20	07-JUN-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	07-JUN-18
Cobalt (Co)-Dissolved		0.00017	0.00018		mg/L	5.4	20	07-JUN-18
Copper (Cu)-Dissolved		0.00182	0.00184		mg/L	1.2	20	07-JUN-18
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	07-JUN-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	07-JUN-18
Lithium (Li)-Dissolved		0.0131	0.0131		mg/L	0.5	20	07-JUN-18
Magnesium (Mg)-Dissolved		79.4	80.1		mg/L	0.9	20	07-JUN-18
Manganese (Mn)-Dissolved		0.0695	0.0701		mg/L	0.8	20	07-JUN-18
Molybdenum (Mo)-Dissolved		0.00110	0.00106		mg/L	3.5	20	07-JUN-18
Nickel (Ni)-Dissolved		0.0333	0.0336		mg/L	0.8	20	07-JUN-18
Potassium (K)-Dissolved		1.69	1.69		mg/L	0.2	20	07-JUN-18
Selenium (Se)-Dissolved		0.0132	0.0139		mg/L	5.6	20	07-JUN-18
Silicon (Si)-Dissolved		4.52	4.52		mg/L	0.1	20	07-JUN-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	07-JUN-18
Sodium (Na)-Dissolved		8.56	8.66		mg/L	1.2	20	07-JUN-18
Strontium (Sr)-Dissolved		0.462	0.457		mg/L	1.0	20	07-JUN-18
Thallium (Tl)-Dissolved		0.000015	0.000015		mg/L	2.4	20	07-JUN-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	07-JUN-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	07-JUN-18
Uranium (U)-Dissolved		0.00242	0.00244		mg/L	0.7	20	07-JUN-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	07-JUN-18
Zinc (Zn)-Dissolved		0.0043	0.0047		mg/L	8.9	20	07-JUN-18
WG2791207-2 LCS								
Aluminum (Al)-Dissolved			106.2		%		80-120	07-JUN-18
Antimony (Sb)-Dissolved			102.2		%		80-120	07-JUN-18
Arsenic (As)-Dissolved			99.0		%		80-120	07-JUN-18
Barium (Ba)-Dissolved			107.8		%		80-120	07-JUN-18
Bismuth (Bi)-Dissolved			104.9		%		80-120	07-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4075411								
WG2791207-2 LCS								
Boron (B)-Dissolved			94.6		%		80-120	07-JUN-18
Cadmium (Cd)-Dissolved			105.0		%		80-120	07-JUN-18
Calcium (Ca)-Dissolved			99.3		%		80-120	07-JUN-18
Chromium (Cr)-Dissolved			99.6		%		80-120	07-JUN-18
Cobalt (Co)-Dissolved			103.0		%		80-120	07-JUN-18
Copper (Cu)-Dissolved			101.5		%		80-120	07-JUN-18
Iron (Fe)-Dissolved			100.4		%		80-120	07-JUN-18
Lead (Pb)-Dissolved			104.0		%		80-120	07-JUN-18
Lithium (Li)-Dissolved			101.0		%		80-120	07-JUN-18
Magnesium (Mg)-Dissolved			102.8		%		80-120	07-JUN-18
Manganese (Mn)-Dissolved			100.1		%		80-120	07-JUN-18
Molybdenum (Mo)-Dissolved			101.6		%		80-120	07-JUN-18
Nickel (Ni)-Dissolved			104.0		%		80-120	07-JUN-18
Potassium (K)-Dissolved			103.3		%		80-120	07-JUN-18
Selenium (Se)-Dissolved			99.97		%		80-120	07-JUN-18
Silicon (Si)-Dissolved			100.7		%		80-120	07-JUN-18
Silver (Ag)-Dissolved			101.7		%		80-120	07-JUN-18
Sodium (Na)-Dissolved			104.6		%		80-120	07-JUN-18
Strontium (Sr)-Dissolved			102.0		%		80-120	07-JUN-18
Thallium (Tl)-Dissolved			106.3		%		80-120	07-JUN-18
Tin (Sn)-Dissolved			102.3		%		80-120	07-JUN-18
Titanium (Ti)-Dissolved			99.2		%		80-120	07-JUN-18
Uranium (U)-Dissolved			103.9		%		80-120	07-JUN-18
Vanadium (V)-Dissolved			103.7		%		80-120	07-JUN-18
Zinc (Zn)-Dissolved			99.2		%		80-120	07-JUN-18
WG2791207-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	07-JUN-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	07-JUN-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	07-JUN-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	07-JUN-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	07-JUN-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	07-JUN-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	07-JUN-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	07-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch	**R4075411**							
WG2791207-1	**MB**	**LF**						
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	07-JUN-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	07-JUN-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	07-JUN-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	07-JUN-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	07-JUN-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	07-JUN-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	07-JUN-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	07-JUN-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	07-JUN-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	07-JUN-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	07-JUN-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	07-JUN-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	07-JUN-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	07-JUN-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	07-JUN-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	07-JUN-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	07-JUN-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	07-JUN-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	07-JUN-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	07-JUN-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	07-JUN-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	07-JUN-18
Batch	**R4083779**							
WG2798162-3	**DUP**	**L2106800-2**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	15-JUN-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	15-JUN-18
Arsenic (As)-Dissolved		0.00039	0.00038		mg/L	2.5	20	15-JUN-18
Barium (Ba)-Dissolved		0.0306	0.0314		mg/L	2.8	20	15-JUN-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	15-JUN-18
Boron (B)-Dissolved		0.017	0.018		mg/L	1.8	20	15-JUN-18
Cadmium (Cd)-Dissolved		0.0000104	0.0000106		mg/L	1.7	20	15-JUN-18
Calcium (Ca)-Dissolved		90.4	91.6		mg/L	1.3	20	15-JUN-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	15-JUN-18
Cobalt (Co)-Dissolved		0.00016	0.00017		mg/L	5.5	20	15-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4083779								
WG2798162-3 DUP		**L2106800-2**						
Copper (Cu)-Dissolved		0.00273	0.00287		mg/L	4.9	20	15-JUN-18
Iron (Fe)-Dissolved		0.136	0.139		mg/L	2.9	20	15-JUN-18
Lead (Pb)-Dissolved		0.000059	0.000058		mg/L	1.5	20	15-JUN-18
Lithium (Li)-Dissolved		0.0108	0.0108		mg/L	0.5	20	15-JUN-18
Magnesium (Mg)-Dissolved		38.1	39.6		mg/L	3.9	20	15-JUN-18
Manganese (Mn)-Dissolved		0.176	0.181		mg/L	3.0	20	15-JUN-18
Molybdenum (Mo)-Dissolved		0.00232	0.00233		mg/L	0.4	20	15-JUN-18
Nickel (Ni)-Dissolved		0.00188	0.00194		mg/L	3.2	20	15-JUN-18
Potassium (K)-Dissolved		1.41	1.48		mg/L	4.5	20	15-JUN-18
Selenium (Se)-Dissolved		0.00169	0.00171		mg/L	0.8	20	15-JUN-18
Silicon (Si)-Dissolved		4.17	4.24		mg/L	1.7	20	15-JUN-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	15-JUN-18
Sodium (Na)-Dissolved		6.09	6.28		mg/L	3.2	20	15-JUN-18
Strontium (Sr)-Dissolved		0.302	0.308		mg/L	1.9	20	15-JUN-18
Thallium (Tl)-Dissolved		0.000017	0.000017		mg/L	0.2	20	15-JUN-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	15-JUN-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	15-JUN-18
Uranium (U)-Dissolved		0.00214	0.00216		mg/L	1.0	20	15-JUN-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	15-JUN-18
Zinc (Zn)-Dissolved		0.0043	0.0044		mg/L	0.8	20	15-JUN-18
WG2798162-2 LCS								
Aluminum (Al)-Dissolved			100.4		%		80-120	15-JUN-18
Antimony (Sb)-Dissolved			101.2		%		80-120	15-JUN-18
Arsenic (As)-Dissolved			101.3		%		80-120	15-JUN-18
Barium (Ba)-Dissolved			103.2		%		80-120	15-JUN-18
Bismuth (Bi)-Dissolved			98.9		%		80-120	15-JUN-18
Boron (B)-Dissolved			95.3		%		80-120	15-JUN-18
Cadmium (Cd)-Dissolved			103.3		%		80-120	15-JUN-18
Calcium (Ca)-Dissolved			97.9		%		80-120	15-JUN-18
Chromium (Cr)-Dissolved			99.6		%		80-120	15-JUN-18
Cobalt (Co)-Dissolved			103.6		%		80-120	15-JUN-18
Copper (Cu)-Dissolved			99.4		%		80-120	15-JUN-18
Iron (Fe)-Dissolved			99.99		%		80-120	15-JUN-18
Lead (Pb)-Dissolved			102.0		%		80-120	15-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4083779								
WG2798162-2 LCS								
Lithium (Li)-Dissolved			98.6		%		80-120	15-JUN-18
Magnesium (Mg)-Dissolved			105.2		%		80-120	15-JUN-18
Manganese (Mn)-Dissolved			104.4		%		80-120	15-JUN-18
Molybdenum (Mo)-Dissolved			99.7		%		80-120	15-JUN-18
Nickel (Ni)-Dissolved			100.2		%		80-120	15-JUN-18
Potassium (K)-Dissolved			104.9		%		80-120	15-JUN-18
Selenium (Se)-Dissolved			96.2		%		80-120	15-JUN-18
Silicon (Si)-Dissolved			98.1		%		80-120	15-JUN-18
Silver (Ag)-Dissolved			106.0		%		80-120	15-JUN-18
Sodium (Na)-Dissolved			102.8		%		80-120	15-JUN-18
Strontium (Sr)-Dissolved			97.8		%		80-120	15-JUN-18
Thallium (Tl)-Dissolved			100.5		%		80-120	15-JUN-18
Tin (Sn)-Dissolved			101.3		%		80-120	15-JUN-18
Titanium (Ti)-Dissolved			98.4		%		80-120	15-JUN-18
Uranium (U)-Dissolved			104.8		%		80-120	15-JUN-18
Vanadium (V)-Dissolved			102.4		%		80-120	15-JUN-18
Zinc (Zn)-Dissolved			95.9		%		80-120	15-JUN-18
WG2798162-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	15-JUN-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	15-JUN-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	15-JUN-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	15-JUN-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	15-JUN-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	15-JUN-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	15-JUN-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	15-JUN-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	15-JUN-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	15-JUN-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	15-JUN-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	15-JUN-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	15-JUN-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	15-JUN-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	15-JUN-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	15-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4083779								
WG2798162-1 MB		**NP**						
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	15-JUN-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	15-JUN-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	15-JUN-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	15-JUN-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	15-JUN-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	15-JUN-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	15-JUN-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	15-JUN-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	15-JUN-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	15-JUN-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	15-JUN-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	15-JUN-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	15-JUN-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	15-JUN-18
MET-T-CCMS-VA	**Water**							
Batch R4075027								
WG2790494-2 LCS								
Aluminum (Al)-Total			99.1		%		80-120	06-JUN-18
Antimony (Sb)-Total			103.1		%		80-120	06-JUN-18
Arsenic (As)-Total			99.2		%		80-120	06-JUN-18
Barium (Ba)-Total			98.0		%		80-120	06-JUN-18
Bismuth (Bi)-Total			100.4		%		80-120	06-JUN-18
Boron (B)-Total			97.2		%		80-120	06-JUN-18
Cadmium (Cd)-Total			99.3		%		80-120	06-JUN-18
Calcium (Ca)-Total			100.6		%		80-120	06-JUN-18
Chromium (Cr)-Total			100.8		%		80-120	06-JUN-18
Cobalt (Co)-Total			99.2		%		80-120	06-JUN-18
Copper (Cu)-Total			101.0		%		80-120	06-JUN-18
Iron (Fe)-Total			107.1		%		80-120	06-JUN-18
Lead (Pb)-Total			101.2		%		80-120	06-JUN-18
Lithium (Li)-Total			107.7		%		80-120	06-JUN-18
Magnesium (Mg)-Total			100.1		%		80-120	06-JUN-18
Manganese (Mn)-Total			99.9		%		80-120	06-JUN-18
Molybdenum (Mo)-Total			99.3		%		80-120	06-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4075027								
WG2790494-2 LCS								
Nickel (Ni)-Total			100.6		%		80-120	06-JUN-18
Potassium (K)-Total			100.3		%		80-120	06-JUN-18
Selenium (Se)-Total			95.9		%		80-120	06-JUN-18
Silicon (Si)-Total			97.7		%		80-120	06-JUN-18
Silver (Ag)-Total			96.2		%		80-120	06-JUN-18
Sodium (Na)-Total			102.1		%		80-120	06-JUN-18
Strontium (Sr)-Total			100.1		%		80-120	06-JUN-18
Thallium (Tl)-Total			100.6		%		80-120	06-JUN-18
Tin (Sn)-Total			100.7		%		80-120	06-JUN-18
Titanium (Ti)-Total			94.3		%		80-120	06-JUN-18
Uranium (U)-Total			109.1		%		80-120	06-JUN-18
Vanadium (V)-Total			100.2		%		80-120	06-JUN-18
Zinc (Zn)-Total			96.1		%		80-120	06-JUN-18
WG2790494-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	06-JUN-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	06-JUN-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	06-JUN-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	06-JUN-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	06-JUN-18
Boron (B)-Total			<0.010		mg/L		0.01	06-JUN-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	06-JUN-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	06-JUN-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	06-JUN-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	06-JUN-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	06-JUN-18
Iron (Fe)-Total			<0.010		mg/L		0.01	06-JUN-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	06-JUN-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	06-JUN-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	06-JUN-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	06-JUN-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	06-JUN-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	06-JUN-18
Potassium (K)-Total			<0.050		mg/L		0.05	06-JUN-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	06-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4075027								
WG2790494-1 MB								
Silicon (Si)-Total			<0.10		mg/L		0.1	06-JUN-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	06-JUN-18
Sodium (Na)-Total			<0.050		mg/L		0.05	06-JUN-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	06-JUN-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	06-JUN-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	06-JUN-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	06-JUN-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	06-JUN-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	06-JUN-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	06-JUN-18
Batch R4075411								
WG2791138-3 DUP		**L2106800-4**						
Aluminum (Al)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	07-JUN-18
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	07-JUN-18
Arsenic (As)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	07-JUN-18
Barium (Ba)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	07-JUN-18
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	07-JUN-18
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	07-JUN-18
Cadmium (Cd)-Total		<0.0000050	<0.0000050	RPD-NA	mg/L	N/A	20	07-JUN-18
Calcium (Ca)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	07-JUN-18
Chromium (Cr)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	07-JUN-18
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	07-JUN-18
Copper (Cu)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	07-JUN-18
Iron (Fe)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	07-JUN-18
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	07-JUN-18
Lithium (Li)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	07-JUN-18
Magnesium (Mg)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	07-JUN-18
Manganese (Mn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	07-JUN-18
Molybdenum (Mo)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	07-JUN-18
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	07-JUN-18
Potassium (K)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	07-JUN-18
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	07-JUN-18
Silicon (Si)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	07-JUN-18
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	07-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4075411								
WG2791138-3 DUP		**L2106800-4**						
Sodium (Na)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	07-JUN-18
Strontium (Sr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	07-JUN-18
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	07-JUN-18
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	07-JUN-18
Titanium (Ti)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	07-JUN-18
Uranium (U)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	07-JUN-18
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	07-JUN-18
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	07-JUN-18
WG2791138-2 LCS								
Aluminum (Al)-Total			105.1		%		80-120	07-JUN-18
Antimony (Sb)-Total			105.2		%		80-120	07-JUN-18
Arsenic (As)-Total			104.5		%		80-120	07-JUN-18
Barium (Ba)-Total			108.4		%		80-120	07-JUN-18
Bismuth (Bi)-Total			104.3		%		80-120	07-JUN-18
Boron (B)-Total			94.8		%		80-120	07-JUN-18
Cadmium (Cd)-Total			104.2		%		80-120	07-JUN-18
Calcium (Ca)-Total			101.1		%		80-120	07-JUN-18
Chromium (Cr)-Total			101.2		%		80-120	07-JUN-18
Cobalt (Co)-Total			106.3		%		80-120	07-JUN-18
Copper (Cu)-Total			103.5		%		80-120	07-JUN-18
Iron (Fe)-Total			104.7		%		80-120	07-JUN-18
Lead (Pb)-Total			103.2		%		80-120	07-JUN-18
Lithium (Li)-Total			101.7		%		80-120	07-JUN-18
Magnesium (Mg)-Total			106.9		%		80-120	07-JUN-18
Manganese (Mn)-Total			103.0		%		80-120	07-JUN-18
Molybdenum (Mo)-Total			100.9		%		80-120	07-JUN-18
Nickel (Ni)-Total			106.6		%		80-120	07-JUN-18
Potassium (K)-Total			104.1		%		80-120	07-JUN-18
Selenium (Se)-Total			104.8		%		80-120	07-JUN-18
Silicon (Si)-Total			105.6		%		80-120	07-JUN-18
Silver (Ag)-Total			100.8		%		80-120	07-JUN-18
Sodium (Na)-Total			106.9		%		80-120	07-JUN-18
Strontium (Sr)-Total			102.3		%		80-120	07-JUN-18
Thallium (Tl)-Total			105.4		%		80-120	07-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4075411								
WG2791138-2 LCS								
Tin (Sn)-Total			101.1		%		80-120	07-JUN-18
Titanium (Ti)-Total			96.9		%		80-120	07-JUN-18
Uranium (U)-Total			100.3		%		80-120	07-JUN-18
Vanadium (V)-Total			104.8		%		80-120	07-JUN-18
Zinc (Zn)-Total			97.9		%		80-120	07-JUN-18
WG2791138-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	07-JUN-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	07-JUN-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	07-JUN-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	07-JUN-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	07-JUN-18
Boron (B)-Total			<0.010		mg/L		0.01	07-JUN-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	07-JUN-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	07-JUN-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	07-JUN-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	07-JUN-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	07-JUN-18
Iron (Fe)-Total			<0.010		mg/L		0.01	07-JUN-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	07-JUN-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	07-JUN-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	07-JUN-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	07-JUN-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	07-JUN-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	07-JUN-18
Potassium (K)-Total			<0.050		mg/L		0.05	07-JUN-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	07-JUN-18
Silicon (Si)-Total			<0.10		mg/L		0.1	07-JUN-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	07-JUN-18
Sodium (Na)-Total			<0.050		mg/L		0.05	07-JUN-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	07-JUN-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	07-JUN-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	07-JUN-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	07-JUN-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	07-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4075411								
WG2791138-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	07-JUN-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	07-JUN-18
Batch R4081327								
WG2794591-3 DUP		**L2106800-2**						
Aluminum (Al)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	12-JUN-18
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-18
Arsenic (As)-Total		0.00057	0.00058		mg/L	3.0	20	12-JUN-18
Barium (Ba)-Total		0.0337	0.0352		mg/L	4.3	20	12-JUN-18
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUN-18
Boron (B)-Total		0.018	0.019		mg/L	1.9	20	12-JUN-18
Cadmium (Cd)-Total		0.0000082	0.0000112	J	mg/L	0.000003	0.00001	12-JUN-18
Calcium (Ca)-Total		96.7	99.0		mg/L	2.3	20	12-JUN-18
Chromium (Cr)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-18
Cobalt (Co)-Total		0.00019	0.00019		mg/L	0.6	20	12-JUN-18
Copper (Cu)-Total		0.0107	0.0109		mg/L	1.4	20	12-JUN-18
Iron (Fe)-Total		0.242	0.248		mg/L	2.2	20	12-JUN-18
Lead (Pb)-Total		0.000368	0.000368		mg/L	0.0	20	12-JUN-18
Lithium (Li)-Total		0.0112	0.0114		mg/L	1.4	20	12-JUN-18
Magnesium (Mg)-Total		41.9	43.2		mg/L	3.0	20	12-JUN-18
Manganese (Mn)-Total		0.189	0.193		mg/L	1.9	20	12-JUN-18
Molybdenum (Mo)-Total		0.00253	0.00249		mg/L	1.6	20	12-JUN-18
Nickel (Ni)-Total		0.00352	0.00350		mg/L	0.4	20	12-JUN-18
Potassium (K)-Total		1.61	1.65		mg/L	2.5	20	12-JUN-18
Selenium (Se)-Total		0.00160	0.00170		mg/L	6.4	20	12-JUN-18
Silicon (Si)-Total		4.82	4.87		mg/L	0.9	20	12-JUN-18
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-JUN-18
Sodium (Na)-Total		6.87	7.10		mg/L	3.2	20	12-JUN-18
Strontium (Sr)-Total		0.333	0.336		mg/L	0.9	20	12-JUN-18
Thallium (Tl)-Total		0.000018	0.000017		mg/L	8.7	20	12-JUN-18
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-18
Titanium (Ti)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	12-JUN-18
Uranium (U)-Total		0.00224	0.00227		mg/L	1.5	20	12-JUN-18
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-18
Zinc (Zn)-Total		0.0064	0.0066		mg/L	2.6	20	12-JUN-18
WG2794591-2								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4081327								
WG2794591-2 LCS								
Aluminum (Al)-Total			104.0		%		80-120	12-JUN-18
Antimony (Sb)-Total			108.5		%		80-120	12-JUN-18
Arsenic (As)-Total			103.8		%		80-120	12-JUN-18
Barium (Ba)-Total			106.1		%		80-120	12-JUN-18
Bismuth (Bi)-Total			101.4		%		80-120	12-JUN-18
Boron (B)-Total			92.6		%		80-120	12-JUN-18
Cadmium (Cd)-Total			102.3		%		80-120	12-JUN-18
Calcium (Ca)-Total			99.9		%		80-120	12-JUN-18
Chromium (Cr)-Total			106.5		%		80-120	12-JUN-18
Cobalt (Co)-Total			103.5		%		80-120	12-JUN-18
Copper (Cu)-Total			103.1		%		80-120	12-JUN-18
Iron (Fe)-Total			101.5		%		80-120	12-JUN-18
Lead (Pb)-Total			101.2		%		80-120	12-JUN-18
Lithium (Li)-Total			97.2		%		80-120	12-JUN-18
Magnesium (Mg)-Total			104.8		%		80-120	12-JUN-18
Manganese (Mn)-Total			102.8		%		80-120	12-JUN-18
Molybdenum (Mo)-Total			105.6		%		80-120	12-JUN-18
Nickel (Ni)-Total			103.9		%		80-120	12-JUN-18
Potassium (K)-Total			106.1		%		80-120	12-JUN-18
Selenium (Se)-Total			95.4		%		80-120	12-JUN-18
Silicon (Si)-Total			97.2		%		80-120	12-JUN-18
Silver (Ag)-Total			102.7		%		80-120	12-JUN-18
Sodium (Na)-Total			104.6		%		80-120	12-JUN-18
Strontium (Sr)-Total			103.3		%		80-120	12-JUN-18
Thallium (Tl)-Total			100.7		%		80-120	12-JUN-18
Tin (Sn)-Total			103.4		%		80-120	12-JUN-18
Titanium (Ti)-Total			104.1		%		80-120	12-JUN-18
Uranium (U)-Total			104.3		%		80-120	12-JUN-18
Vanadium (V)-Total			105.4		%		80-120	12-JUN-18
Zinc (Zn)-Total			93.3		%		80-120	12-JUN-18
WG2794591-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	12-JUN-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	12-JUN-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	12-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4081327								
WG2794591-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	12-JUN-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	12-JUN-18
Boron (B)-Total			<0.010		mg/L		0.01	12-JUN-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	12-JUN-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	12-JUN-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	12-JUN-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	12-JUN-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	12-JUN-18
Iron (Fe)-Total			<0.010		mg/L		0.01	12-JUN-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	12-JUN-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	12-JUN-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	12-JUN-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	12-JUN-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	12-JUN-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	12-JUN-18
Potassium (K)-Total			<0.050		mg/L		0.05	12-JUN-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	12-JUN-18
Silicon (Si)-Total			<0.10		mg/L		0.1	12-JUN-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	12-JUN-18
Sodium (Na)-Total			<0.050		mg/L		0.05	12-JUN-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	12-JUN-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	12-JUN-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	12-JUN-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	12-JUN-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	12-JUN-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	12-JUN-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	12-JUN-18
NH3-F-VA	**Water**							
Batch R4075619								
WG2790725-6 LCS								
Ammonia, Total (as N)			92.6		%		85-115	07-JUN-18
WG2790725-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	07-JUN-18
NO2-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-VA	**Water**							
Batch R4075448								
WG2790591-7 DUP		**L2106800-1**						
Nitrite (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	06-JUN-18
WG2790591-6 LCS								
Nitrite (as N)			104.9		%		90-110	06-JUN-18
WG2790591-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	06-JUN-18
NO3-L-IC-N-VA	**Water**							
Batch R4075448								
WG2790591-7 DUP		**L2106800-1**						
Nitrate (as N)		0.563	0.580		mg/L	2.9	20	06-JUN-18
WG2790591-6 LCS								
Nitrate (as N)			102.3		%		90-110	06-JUN-18
WG2790591-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	06-JUN-18
ORP-VA	**Water**							
Batch R4074307								
WG2790599-1 CRM		**VA-ORP**						
ORP			221		mV		210-230	06-JUN-18
WG2790599-2 DUP		**L2106800-2**						
ORP		359	357	J	mV	2.1	15	06-JUN-18
P-T-PRES-COL-VA	**Water**							
Batch R4075243								
WG2790777-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			101.0		%		80-120	07-JUN-18
WG2790777-3 DUP		**L2106800-1**						
Phosphorus (P)-Total		0.0054	0.0049		mg/L	9.0	20	07-JUN-18
WG2790777-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	07-JUN-18
WG2790777-4 MS		**L2106800-2**						
Phosphorus (P)-Total			101.0		%		70-130	07-JUN-18
PH-PCT-VA	**Water**							
Batch R4072729								
WG2790070-2 CRM		**VA-PH7-BUF**						
pH			7.00		pH		6.9-7.1	06-JUN-18
PO4-DO-COL-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-COL-VA	**Water**							
Batch R4074628								
WG2790708-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			96.7		%		80-120	07-JUN-18
WG2790708-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	07-JUN-18
SO4-IC-N-VA	**Water**							
Batch R4075448								
WG2790591-7 DUP		**L2106800-1**						
Sulfate (SO4)		476	493		mg/L	3.5	20	06-JUN-18
WG2790591-6 LCS								
Sulfate (SO4)			102.9		%		90-110	06-JUN-18
WG2790591-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	06-JUN-18
TDS-LOW-VA	**Water**							
Batch R4074993								
WG2790487-3 DUP		**L2106800-1**						
Total Dissolved Solids		1070	998		mg/L	6.7	20	06-JUN-18
WG2790487-2 LCS								
Total Dissolved Solids			102.7		%		85-115	06-JUN-18
WG2790487-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	06-JUN-18
TKN-F-VA	**Water**							
Batch R4075821								
WG2790402-10 LCS								
Total Kjeldahl Nitrogen			100.2		%		75-125	07-JUN-18
WG2790402-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	07-JUN-18
TSS-LOW-VA	**Water**							
Batch R4075019								
WG2790111-2 LCS								
Total Suspended Solids			95.5		%		85-115	06-JUN-18
WG2790111-1 MB								
Total Suspended Solids			<1.0		mg/L		1	06-JUN-18
TURBIDITY-VA	**Water**							
Batch R4074067								
WG2790548-2 CRM		**VA-FORM-40**						
Turbidity			100.8		%		85-115	06-JUN-18
WG2790548-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-VA	**Water**							
Batch R4074067								
WG2790548-1 MB								
Turbidity			<0.10		NTU		0.1	06-JUN-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	04-JUN-18 12:30	06-JUN-18 19:00	0.25	54	hours	EHTR-FM
	2	04-JUN-18 14:00	06-JUN-18 19:00	0.25	53	hours	EHTR-FM
	3	04-JUN-18	06-JUN-18 19:00	0.25	55	hours	EHTR-FM
	4	04-JUN-18	06-JUN-18 19:00	0.25	55	hours	EHTR-FM
pH by Meter (Automated)							
	1	04-JUN-18 12:30	06-JUN-18 10:43	0.25	46	hours	EHTR-FM
	2	04-JUN-18 14:00	06-JUN-18 10:43	0.25	45	hours	EHTR-FM
	3	04-JUN-18	06-JUN-18 10:43	0.25	47	hours	EHTR-FM
	4	04-JUN-18	06-JUN-18 10:43	0.25	47	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2106800 were received on 06-JUN-18 09:15.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	GHO_Q2_WG_2018-04-01	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Greenhills Operation
Project Manager	Jeremy Enns
Email	Jeremy.Enns@teck.com
Address	P.O. BOX 5000
City	Elkford
Province	BC
Postal Code	V0B1H0
Country	Canada
Phone Number	250-865-3341

LABORATORY

Lab Name	ALS ~~Calgary~~ Burnaby.
Lab Contact	~~[illegible]~~ Can Dang.
Email	~~[illegible]~~ @ALSGlobal.com
Address	~~[illegible]~~ 8081 Lougheed Hwy.
City	~~Calgary~~ Burnaby
Province	~~AB~~ BC
Postal Code	~~[illegible]~~
Country	Canada
Phone Number	~~403 [illegible] 7794~~

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Jeremy.Enns@teck.com	X	X	X
Email 2:	Leigh.Stickney@teck.com	X	X	X
Email 3:	teckcoal@equisonline.com			X
PO number	540380			

SAMPLE DETAILS / ANALYSIS REQUESTED

L2106800-COFC

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-ROUTINE-VA	TECKCOAL-MET-T-VA
Filt.								N	N	N		N	N	N
Preserv.								NONE	H2SO4	NONE	HCL	NONE	NONE	HNO3
[redacted]						G	7	1	1	1	1	1	1	1
GH_POTW17_WG_2018-04-01_NP	GH_POTW17	WG		[illegible]	12:30 ~~[illegible]~~	G	7	1	1	1	1	1	1	1
GH_POTW09_WG_2018-04-01_NP	GH_POTW09	WG		2018/04/24	14:00	G	7	1	1	1	1	1	1	1
[redacted]						G	7	1	1	1	1	1	1	1
GH_GWD2_WG_2018-04-01_NP	GH_GWD2	WG				G	7	1	1	1	1	1	1	1
GH_GWB2_WG_2018-04-01_NP	GH_GWB2	WG				G	7	1	1	1	1	1	1	1

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
J. Kr[illegible]		JC 16°C	6/6/18 9:15AM

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
BOX 5000
ELKFORD BC V0B1H0

Date Received: 12-JUN-18
Report Date: 06-JUL-18 20:56 (MT)
Version: FINAL

Client Phone: 250-865-3305

Certificate of Analysis

Lab Work Order #: L2110527

Project P.O. #: VPO00540380
Job Reference: GREENHILLS OPERATIONS
C of C Numbers: GHO_WEK_WS_MAY28
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2110527-1 GH_POTW15_WS_2018-06-11_N							
Sampled By: CLIENT on 11-JUN-18 @ 13:34							
Matrix: WS							
Miscellaneous Parameters							
Dissolved Organic Carbon	0.97		0.50	mg/L		24-JUN-18	R4096506
Total Kjeldahl Nitrogen	0.078		0.050	mg/L		26-JUN-18	R4097744
Mercury (Hg)-Total	<0.00050		0.00050	ug/L		16-JUN-18	R4084704
Total Organic Carbon	0.98		0.50	mg/L		24-JUN-18	R4096506
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	14-JUN-18	18-JUN-18	R4089232
Dissolved Metals Filtration Location	FIELD					14-JUN-18	R4083208
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	14-JUN-18	19-JUN-18	R4090038
Dissolved Mercury Filtration Location	FIELD					14-JUN-18	R4082542
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					14-JUN-18	R4083208
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	14-JUN-18	18-JUN-18	R4089232
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Arsenic (As)-Dissolved	0.00192		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Barium (Ba)-Dissolved	0.0280		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	14-JUN-18	18-JUN-18	R4089232
Boron (B)-Dissolved	0.019		0.010	mg/L	14-JUN-18	18-JUN-18	R4089232
Cadmium (Cd)-Dissolved	0.0186		0.0050	ug/L	14-JUN-18	18-JUN-18	R4089232
Calcium (Ca)-Dissolved	146		0.050	mg/L	14-JUN-18	18-JUN-18	R4089232
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Cobalt (Co)-Dissolved	0.29		0.10	ug/L	14-JUN-18	18-JUN-18	R4089232
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	14-JUN-18	18-JUN-18	R4089232
Iron (Fe)-Dissolved	0.970		0.010	mg/L	14-JUN-18	18-JUN-18	R4089232
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	14-JUN-18	18-JUN-18	R4089232
Lithium (Li)-Dissolved	0.0158		0.0010	mg/L	14-JUN-18	18-JUN-18	R4089232
Magnesium (Mg)-Dissolved	53.1		0.10	mg/L	14-JUN-18	18-JUN-18	R4089232
Manganese (Mn)-Dissolved	0.226		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Molybdenum (Mo)-Dissolved	0.00248		0.000050	mg/L	14-JUN-18	18-JUN-18	R4089232
Nickel (Ni)-Dissolved	0.00138		0.00050	mg/L	14-JUN-18	18-JUN-18	R4089232
Potassium (K)-Dissolved	1.81		0.050	mg/L	14-JUN-18	18-JUN-18	R4089232
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	14-JUN-18	18-JUN-18	R4089232
Silicon (Si)-Dissolved	4.27		0.050	mg/L	14-JUN-18	18-JUN-18	R4089232
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	14-JUN-18	18-JUN-18	R4089232
Sodium (Na)-Dissolved	14.3		0.050	mg/L	14-JUN-18	18-JUN-18	R4089232
Strontium (Sr)-Dissolved	0.439		0.00020	mg/L	14-JUN-18	18-JUN-18	R4089232
Thallium (Tl)-Dissolved	0.000018		0.000010	mg/L	14-JUN-18	18-JUN-18	R4089232
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	14-JUN-18	18-JUN-18	R4089232
Uranium (U)-Dissolved	0.00156		0.000010	mg/L	14-JUN-18	18-JUN-18	R4089232
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	14-JUN-18	18-JUN-18	R4089232
Zinc (Zn)-Dissolved	0.0013		0.0010	mg/L	14-JUN-18	19-JUN-18	R4090887
Hardness							
Hardness (as CaCO3)	582		0.50	mg/L		20-JUN-18	
Total Metals in Water							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		16-JUN-18	R4088897
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0038		0.0030	mg/L		16-JUN-18	R4088897
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		16-JUN-18	R4088897

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2110527-1 GH_POTW15_WS_2018-06-11_N							
Sampled By: CLIENT on 11-JUN-18 @ 13:34							
Matrix: WS							
Total Metals in Water by CRC ICPMS							
Arsenic (As)-Total	0.00186		0.00010	mg/L		16-JUN-18	R4088897
Barium (Ba)-Total	0.0230		0.00010	mg/L		16-JUN-18	R4088897
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		16-JUN-18	R4088897
Boron (B)-Total	0.021		0.010	mg/L		16-JUN-18	R4088897
Cadmium (Cd)-Total	0.0133		0.0050	ug/L		16-JUN-18	R4088897
Calcium (Ca)-Total	136		0.050	mg/L		16-JUN-18	R4088897
Chromium (Cr)-Total	0.00013		0.00010	mg/L		16-JUN-18	R4088897
Cobalt (Co)-Total	0.25		0.10	ug/L		16-JUN-18	R4088897
Copper (Cu)-Total	0.00545		0.00050	mg/L		16-JUN-18	R4088897
Iron (Fe)-Total	1.24		0.010	mg/L		16-JUN-18	R4088897
Lead (Pb)-Total	0.000282		0.000050	mg/L		16-JUN-18	R4088897
Lithium (Li)-Total	0.0156		0.0010	mg/L		16-JUN-18	R4088897
Magnesium (Mg)-Total	50.8		0.10	mg/L		16-JUN-18	R4088897
Manganese (Mn)-Total	0.201		0.00010	mg/L		16-JUN-18	R4088897
Molybdenum (Mo)-Total	0.00240		0.000050	mg/L		16-JUN-18	R4088897
Nickel (Ni)-Total	0.00593		0.00050	mg/L		16-JUN-18	R4088897
Potassium (K)-Total	1.55		0.050	mg/L		16-JUN-18	R4088897
Selenium (Se)-Total	<0.050		0.050	ug/L		16-JUN-18	R4088897
Silicon (Si)-Total	4.43		0.10	mg/L		16-JUN-18	R4088897
Silver (Ag)-Total	<0.000010		0.000010	mg/L		16-JUN-18	R4088897
Sodium (Na)-Total	12.5		0.050	mg/L		16-JUN-18	R4088897
Strontium (Sr)-Total	0.409		0.00020	mg/L		16-JUN-18	R4088897
Thallium (Tl)-Total	0.000016		0.000010	mg/L		16-JUN-18	R4088897
Tin (Sn)-Total	<0.00010		0.00010	mg/L		16-JUN-18	R4088897
Titanium (Ti)-Total	<0.010		0.010	mg/L		16-JUN-18	R4088897
Uranium (U)-Total	0.00145		0.000010	mg/L		16-JUN-18	R4088897
Vanadium (V)-Total	<0.0010	DLB	0.0010	mg/L		16-JUN-18	R4088897
Zinc (Zn)-Total	0.0084		0.0030	mg/L		16-JUN-18	R4088897
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	4.7		1.0	mg/L		23-JUN-18	R4095982
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	241		1.0	mg/L		22-JUN-18	R4095370
Alkalinity, Carbonate (as CaCO3)	3.4		1.0	mg/L		22-JUN-18	R4095370
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		22-JUN-18	R4095370
Alkalinity, Total (as CaCO3)	245		1.0	mg/L		22-JUN-18	R4095370
Ammonia, Total (as N)							
Ammonia as N	0.0445		0.0050	mg/L		21-JUN-18	R4094436
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLHC	0.25	mg/L		12-JUN-18	R4081998
Chloride in Water by IC							
Chloride (Cl)	38.0	DLHC	2.5	mg/L		12-JUN-18	R4081998
Electrical Conductivity (EC)							
Conductivity (@ 25C)	986		2.0	uS/cm		22-JUN-18	R4095370
Fluoride in Water by IC							
Fluoride (F)	0.22	DLHC	0.10	mg/L		12-JUN-18	R4081998
Ion Balance Calculation							
Ion Balance	105		-100	%		24-JUN-18	
Ion Balance Calculation							
Cation - Anion Balance	2.4			%		24-JUN-18	
Anion Sum	11.8			meq/L		24-JUN-18	
Cation Sum	12.4			meq/L		24-JUN-18	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2110527-1 GH_POTW15_WS_2018-06-11_N							
Sampled By: CLIENT on 11-JUN-18 @ 13:34							
Matrix: WS							
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.026	DLHC	0.025	mg/L		12-JUN-18	R4081998
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0050	DLHC	0.0050	mg/L		12-JUN-18	R4081998
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		13-JUN-18	R4082874
Oxidation redution potential by elect.							
ORP	354		-1000	mV		03-JUL-18	R4112692
Sulfate in Water by IC							
Sulfate (SO4)	279	DLHC	1.5	mg/L		12-JUN-18	R4081998
Total Dissolved Solids							
Total Dissolved Solids	692	DLHC	20	mg/L		15-JUN-18	R4086468
Total P in Water by Colour							
Phosphorus (P)-Total	0.0017		0.0010	mg/L		05-JUL-18	R4113733
Total Suspended Solids							
Total Suspended Solids	1.7		1.0	mg/L		15-JUN-18	R4084710
Turbidity							
Turbidity	11.6		0.10	NTU		13-JUN-18	R4083327
pH							
pH	8.28		0.10	pH		22-JUN-18	R4095370
L2110527-2 GH_POTW10_WS_2018-06-11_N							
Sampled By: CLIENT on 11-JUN-18 @ 13:28							
Matrix: WS							
Miscellaneous Parameters							
Dissolved Organic Carbon	<0.50		0.50	mg/L		24-JUN-18	R4096506
Total Kjeldahl Nitrogen	0.142		0.050	mg/L		26-JUN-18	R4097744
Mercury (Hg)-Total	<0.00050		0.00050	ug/L		16-JUN-18	R4084704
Total Organic Carbon	<0.50		0.50	mg/L		24-JUN-18	R4096506
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	14-JUN-18	18-JUN-18	R4089232
Dissolved Metals Filtration Location	FIELD					14-JUN-18	R4083208
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	14-JUN-18	19-JUN-18	R4090038
Dissolved Mercury Filtration Location	FIELD					14-JUN-18	R4082542
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					14-JUN-18	R4083208
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	14-JUN-18	18-JUN-18	R4089232
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Arsenic (As)-Dissolved	0.00181		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Barium (Ba)-Dissolved	0.0215		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	14-JUN-18	18-JUN-18	R4089232
Boron (B)-Dissolved	0.033		0.010	mg/L	14-JUN-18	18-JUN-18	R4089232
Cadmium (Cd)-Dissolved	0.0119		0.0050	ug/L	14-JUN-18	18-JUN-18	R4089232
Calcium (Ca)-Dissolved	97.6		0.050	mg/L	14-JUN-18	18-JUN-18	R4089232
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Cobalt (Co)-Dissolved	0.17		0.10	ug/L	14-JUN-18	18-JUN-18	R4089232
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	14-JUN-18	18-JUN-18	R4089232
Iron (Fe)-Dissolved	0.822		0.010	mg/L	14-JUN-18	18-JUN-18	R4089232
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	14-JUN-18	18-JUN-18	R4089232
Lithium (Li)-Dissolved	0.0164		0.0010	mg/L	14-JUN-18	18-JUN-18	R4089232
Magnesium (Mg)-Dissolved	44.3		0.10	mg/L	14-JUN-18	18-JUN-18	R4089232

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2110527-2 GH_POTW10_WS_2018-06-11_N							
Sampled By: CLIENT on 11-JUN-18 @ 13:28							
Matrix: WS							
Dissolved Metals in Water by CRC ICPMS							
Manganese (Mn)-Dissolved	0.0562		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Molybdenum (Mo)-Dissolved	0.00291		0.000050	mg/L	14-JUN-18	18-JUN-18	R4089232
Nickel (Ni)-Dissolved	0.00121		0.00050	mg/L	14-JUN-18	18-JUN-18	R4089232
Potassium (K)-Dissolved	1.80		0.050	mg/L	14-JUN-18	18-JUN-18	R4089232
Selenium (Se)-Dissolved	2.45		0.050	ug/L	14-JUN-18	18-JUN-18	R4089232
Silicon (Si)-Dissolved	4.63		0.050	mg/L	14-JUN-18	18-JUN-18	R4089232
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	14-JUN-18	18-JUN-18	R4089232
Sodium (Na)-Dissolved	5.34		0.050	mg/L	14-JUN-18	18-JUN-18	R4089232
Strontium (Sr)-Dissolved	0.559		0.00020	mg/L	14-JUN-18	18-JUN-18	R4089232
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	14-JUN-18	18-JUN-18	R4089232
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	14-JUN-18	18-JUN-18	R4089232
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	14-JUN-18	18-JUN-18	R4089232
Uranium (U)-Dissolved	0.000721		0.000010	mg/L	14-JUN-18	18-JUN-18	R4089232
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	14-JUN-18	18-JUN-18	R4089232
Zinc (Zn)-Dissolved	0.0027		0.0010	mg/L	14-JUN-18	18-JUN-18	R4089232
Hardness							
Hardness (as CaCO3)	426		0.50	mg/L		19-JUN-18	
Total Metals in Water							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		16-JUN-18	R4088897
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		16-JUN-18	R4088897
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		16-JUN-18	R4088897
Arsenic (As)-Total	0.00172		0.00010	mg/L		16-JUN-18	R4088897
Barium (Ba)-Total	0.0186		0.00010	mg/L		16-JUN-18	R4088897
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		16-JUN-18	R4088897
Boron (B)-Total	0.037		0.010	mg/L		16-JUN-18	R4088897
Cadmium (Cd)-Total	0.0062		0.0050	ug/L		16-JUN-18	R4088897
Calcium (Ca)-Total	94.9		0.050	mg/L		16-JUN-18	R4088897
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		16-JUN-18	R4088897
Cobalt (Co)-Total	0.17		0.10	ug/L		16-JUN-18	R4088897
Copper (Cu)-Total	<0.00050		0.00050	mg/L		16-JUN-18	R4088897
Iron (Fe)-Total	0.911		0.010	mg/L		16-JUN-18	R4088897
Lead (Pb)-Total	0.000101		0.000050	mg/L		16-JUN-18	R4088897
Lithium (Li)-Total	0.0163		0.0010	mg/L		16-JUN-18	R4088897
Magnesium (Mg)-Total	44.7		0.10	mg/L		16-JUN-18	R4088897
Manganese (Mn)-Total	0.0525		0.00010	mg/L		16-JUN-18	R4088897
Molybdenum (Mo)-Total	0.00279		0.000050	mg/L		16-JUN-18	R4088897
Nickel (Ni)-Total	0.00868		0.00050	mg/L		16-JUN-18	R4088897
Potassium (K)-Total	1.61		0.050	mg/L		16-JUN-18	R4088897
Selenium (Se)-Total	2.66		0.050	ug/L		16-JUN-18	R4088897
Silicon (Si)-Total	4.95		0.10	mg/L		16-JUN-18	R4088897
Silver (Ag)-Total	<0.000010		0.000010	mg/L		16-JUN-18	R4088897
Sodium (Na)-Total	4.85		0.050	mg/L		16-JUN-18	R4088897
Strontium (Sr)-Total	0.542		0.00020	mg/L		16-JUN-18	R4088897
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		16-JUN-18	R4088897
Tin (Sn)-Total	<0.00010		0.00010	mg/L		16-JUN-18	R4088897
Titanium (Ti)-Total	<0.010		0.010	mg/L		16-JUN-18	R4088897
Uranium (U)-Total	0.000672		0.000010	mg/L		16-JUN-18	R4088897
Vanadium (V)-Total	<0.0010	DLB	0.0010	mg/L		16-JUN-18	R4088897
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		16-JUN-18	R4088897
Routine for Teck Coal							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2110527-2 GH_POTW10_WS_2018-06-11_N							
Sampled By: CLIENT on 11-JUN-18 @ 13:28							
Matrix: WS							
Acidity by Automatic Titration							
Acidity (as CaCO3)	1.1		1.0	mg/L		23-JUN-18	R4095982
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	225		1.0	mg/L		22-JUN-18	R4095370
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		22-JUN-18	R4095370
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		22-JUN-18	R4095370
Alkalinity, Total (as CaCO3)	225		1.0	mg/L		22-JUN-18	R4095370
Ammonia, Total (as N)							
Ammonia as N	0.0698		0.0050	mg/L		21-JUN-18	R4094436
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		12-JUN-18	R4081998
Chloride in Water by IC							
Chloride (Cl)	5.68		0.50	mg/L		12-JUN-18	R4081998
Electrical Conductivity (EC)							
Conductivity (@ 25C)	726		2.0	uS/cm		22-JUN-18	R4095370
Fluoride in Water by IC							
Fluoride (F)	0.968		0.020	mg/L		12-JUN-18	R4081998
Ion Balance Calculation							
Ion Balance	100		-100	%		24-JUN-18	
Ion Balance Calculation							
Cation - Anion Balance	0.0			%		24-JUN-18	
Anion Sum	8.85			meq/L		24-JUN-18	
Cation Sum	8.85			meq/L		24-JUN-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.269		0.0050	mg/L		12-JUN-18	R4081998
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.0154		0.0010	mg/L		12-JUN-18	R4081998
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		13-JUN-18	R4082874
Oxidation redution potential by elect.							
ORP	405		-1000	mV		03-JUL-18	R4112692
Sulfate in Water by IC							
Sulfate (SO4)	198		0.30	mg/L		12-JUN-18	R4081998
Total Dissolved Solids							
Total Dissolved Solids	515	DLHC	20	mg/L		15-JUN-18	R4086468
Total P in Water by Colour							
Phosphorus (P)-Total	0.0029		0.0010	mg/L		05-JUL-18	R4113733
Total Suspended Solids							
Total Suspended Solids	1.1		1.0	mg/L		15-JUN-18	R4084710
Turbidity							
Turbidity	10.4		0.10	NTU		13-JUN-18	R4083327
pH							
pH	8.20		0.10	pH		22-JUN-18	R4095370
L2110527-3 GH_POTW15_WS_2018-06-11_FB-HG							
Sampled By: CLIENT on 11-JUN-18 @ 13:34							
Matrix: WS							
Miscellaneous Parameters							
Mercury (Hg)-Total	<0.00050		0.00050	ug/L		16-JUN-18	R4084704
L2110527-4 GH_POTW10_WS_2018-06-11_FB-HG							
Sampled By: CLIENT on 11-JUN-18 @ 13:28							
Matrix: WS							
Miscellaneous Parameters							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2110527-4 GH_POTW10_WS_2018-06-11_FB-HG							
Sampled By: CLIENT on 11-JUN-18 @ 13:28							
Matrix: WS							
Mercury (Hg)-Total	<0.00050		0.00050	ug/L		16-JUN-18	R4084704

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	DOC and dissolved metals to be filtered and preserved in lab; filter code added - Sample was Filtered and Preserved at the laboratory

Sample Parameter Qualifier Key:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental
This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide. The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC. TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.			
C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide. The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC. TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.			
CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B
Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.			
F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
HG-T-U-CVAF-VA	Water	Total Mercury in Water by CVAFS (Ultra)	EPA 1631 REV. E
This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.			
IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E
Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.			
Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:			
Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]			
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498
This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.			
It is recommended that this analysis be conducted in the field.			
P-T-L-COL-ED	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-CL	Water	pH	APHA 4500 H-Electrode
pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)			
PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C
A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).			
TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E
Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.			
Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:			
Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]			
TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)
This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.			
TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			
TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer
This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

GHO_WEK_WS_MAY28

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2110527 Report Date: 06-JUL-18

Client: TECK COAL LIMITED (GREENHILLS)
BOX 5000
ELKFORD BC V0B1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4095982								
WG2805597-8 LCS								
Acidity (as CaCO3)			103.3		%		85-115	23-JUN-18
WG2805597-7 MB								
Acidity (as CaCO3)			1.9		mg/L		2	23-JUN-18
ALK-MAN-CL	**Water**							
Batch R4095370								
WG2804813-20 LCS								
Alkalinity, Total (as CaCO3)			101.4		%		85-115	22-JUN-18
WG2804813-19 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	22-JUN-18
BE-D-L-CCMS-VA	**Water**							
Batch R4089232								
WG2797352-3 DUP		**L2110527-1**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	18-JUN-18
WG2797352-2 LCS								
Beryllium (Be)-Dissolved			97.3		%		80-120	18-JUN-18
WG2797352-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	18-JUN-18
BE-T-L-CCMS-VA	**Water**							
Batch R4088897								
WG2796845-2 LCS								
Beryllium (Be)-Total			101.9		%		80-120	16-JUN-18
WG2796845-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	16-JUN-18
BR-L-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-10 LCS								
Bromide (Br)			102.0		%		85-115	12-JUN-18
WG2796060-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	12-JUN-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4096506								
WG2806203-2 LCS								
Dissolved Organic Carbon			96.3		%		80-120	24-JUN-18
WG2806203-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	24-JUN-18
C-TOT-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4096506								
WG2806203-2 LCS								
Total Organic Carbon			95.2		%		80-120	24-JUN-18
WG2806203-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	24-JUN-18
CL-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-10 LCS								
Chloride (Cl)			101.1		%		90-110	12-JUN-18
WG2796060-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	12-JUN-18
EC-L-PCT-CL	**Water**							
Batch R4095370								
WG2804813-20 LCS								
Conductivity (@ 25C)			98.8		%		90-110	22-JUN-18
WG2804813-19 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	22-JUN-18
F-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-10 LCS								
Fluoride (F)			108.0		%		90-110	12-JUN-18
WG2796060-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	12-JUN-18
HG-D-CVAA-VA	**Water**							
Batch R4089054								
WG2796717-2 LCS								
Mercury (Hg)-Dissolved			99.7		%		80-120	19-JUN-18
WG2796717-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	19-JUN-18
HG-T-U-CVAF-VA	**Water**							
Batch R4084704								
WG2799229-2 LCS								
Mercury (Hg)-Total			95.9		%		80-120	16-JUN-18
WG2799229-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	16-JUN-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4089232								
WG2797352-3 DUP		**L2110527-1**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	18-JUN-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-18
Arsenic (As)-Dissolved		0.00192	0.00186		mg/L	3.2	20	18-JUN-18
Barium (Ba)-Dissolved		0.0280	0.0271		mg/L	3.1	20	18-JUN-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-JUN-18
Boron (B)-Dissolved		0.019	0.019		mg/L	0.2	20	18-JUN-18
Cadmium (Cd)-Dissolved		0.0000186	0.0000155		mg/L	18	20	18-JUN-18
Calcium (Ca)-Dissolved		146	144		mg/L	1.3	20	18-JUN-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-18
Cobalt (Co)-Dissolved		0.00029	0.00029		mg/L	2.6	20	18-JUN-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-JUN-18
Iron (Fe)-Dissolved		0.970	0.937		mg/L	3.4	20	18-JUN-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-JUN-18
Lithium (Li)-Dissolved		0.0158	0.0158		mg/L	0.0	20	18-JUN-18
Magnesium (Mg)-Dissolved		53.1	51.4		mg/L	3.3	20	18-JUN-18
Manganese (Mn)-Dissolved		0.226	0.219		mg/L	3.5	20	18-JUN-18
Molybdenum (Mo)-Dissolved		0.00248	0.00248		mg/L	0.1	20	18-JUN-18
Nickel (Ni)-Dissolved		0.00138	0.00135		mg/L	2.6	20	18-JUN-18
Potassium (K)-Dissolved		1.81	1.82		mg/L	1.0	20	18-JUN-18
Selenium (Se)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-JUN-18
Silicon (Si)-Dissolved		4.27	4.08		mg/L	4.5	20	18-JUN-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	18-JUN-18
Sodium (Na)-Dissolved		14.3	14.1		mg/L	1.6	20	18-JUN-18
Strontium (Sr)-Dissolved		0.439	0.434		mg/L	1.2	20	18-JUN-18
Thallium (Tl)-Dissolved		0.000018	0.000019		mg/L	4.9	20	18-JUN-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	18-JUN-18
Uranium (U)-Dissolved		0.00156	0.00154		mg/L	1.4	20	18-JUN-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-JUN-18
WG2797352-2 LCS								
Aluminum (Al)-Dissolved			100.8		%		80-120	18-JUN-18
Antimony (Sb)-Dissolved			96.9		%		80-120	18-JUN-18
Arsenic (As)-Dissolved			101.0		%		80-120	18-JUN-18
Barium (Ba)-Dissolved			105.2		%		80-120	18-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4089232								
WG2797352-2 LCS								
Bismuth (Bi)-Dissolved			103.7		%		80-120	18-JUN-18
Boron (B)-Dissolved			90.5		%		80-120	18-JUN-18
Cadmium (Cd)-Dissolved			99.2		%		80-120	18-JUN-18
Calcium (Ca)-Dissolved			95.0		%		80-120	18-JUN-18
Chromium (Cr)-Dissolved			99.6		%		80-120	18-JUN-18
Cobalt (Co)-Dissolved			100.6		%		80-120	18-JUN-18
Copper (Cu)-Dissolved			100.6		%		80-120	18-JUN-18
Iron (Fe)-Dissolved			97.1		%		80-120	18-JUN-18
Lead (Pb)-Dissolved			98.3		%		80-120	18-JUN-18
Lithium (Li)-Dissolved			96.8		%		80-120	18-JUN-18
Magnesium (Mg)-Dissolved			103.7		%		80-120	18-JUN-18
Manganese (Mn)-Dissolved			99.7		%		80-120	18-JUN-18
Molybdenum (Mo)-Dissolved			98.8		%		80-120	18-JUN-18
Nickel (Ni)-Dissolved			101.8		%		80-120	18-JUN-18
Potassium (K)-Dissolved			101.4		%		80-120	18-JUN-18
Selenium (Se)-Dissolved			94.8		%		80-120	18-JUN-18
Silicon (Si)-Dissolved			99.4		%		80-120	18-JUN-18
Silver (Ag)-Dissolved			96.4		%		80-120	18-JUN-18
Sodium (Na)-Dissolved			103.7		%		80-120	18-JUN-18
Strontium (Sr)-Dissolved			94.7		%		80-120	18-JUN-18
Thallium (Tl)-Dissolved			100.7		%		80-120	18-JUN-18
Tin (Sn)-Dissolved			96.3		%		80-120	18-JUN-18
Titanium (Ti)-Dissolved			101.1		%		80-120	18-JUN-18
Uranium (U)-Dissolved			97.2		%		80-120	18-JUN-18
Vanadium (V)-Dissolved			104.2		%		80-120	18-JUN-18
Zinc (Zn)-Dissolved			96.8		%		80-120	18-JUN-18
WG2797352-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	18-JUN-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	18-JUN-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	18-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4089232								
WG2797352-1 MB		**NP**						
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	18-JUN-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	18-JUN-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	18-JUN-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	18-JUN-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	18-JUN-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	18-JUN-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	18-JUN-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	18-JUN-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	18-JUN-18
Batch R4090887								
WG2797352-3 DUP		**L2110527-1**						
Zinc (Zn)-Dissolved		0.0013	0.0013		mg/L	4.0	20	19-JUN-18
MET-T-CCMS-VA	**Water**							
Batch R4088897								
WG2796845-2 LCS								
Aluminum (Al)-Total			98.3		%		80-120	16-JUN-18
Antimony (Sb)-Total			106.6		%		80-120	16-JUN-18
Arsenic (As)-Total			94.8		%		80-120	16-JUN-18
Barium (Ba)-Total			98.6		%		80-120	16-JUN-18
Bismuth (Bi)-Total			106.9		%		80-120	16-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4088897								
WG2796845-2 LCS								
Boron (B)-Total			99.1		%		80-120	16-JUN-18
Cadmium (Cd)-Total			96.4		%		80-120	16-JUN-18
Calcium (Ca)-Total			96.6		%		80-120	16-JUN-18
Chromium (Cr)-Total			92.4		%		80-120	16-JUN-18
Cobalt (Co)-Total			94.8		%		80-120	16-JUN-18
Copper (Cu)-Total			95.1		%		80-120	16-JUN-18
Iron (Fe)-Total			89.7		%		80-120	16-JUN-18
Lead (Pb)-Total			96.4		%		80-120	16-JUN-18
Lithium (Li)-Total			101.4		%		80-120	16-JUN-18
Magnesium (Mg)-Total			106.7		%		80-120	16-JUN-18
Manganese (Mn)-Total			95.1		%		80-120	16-JUN-18
Molybdenum (Mo)-Total			98.3		%		80-120	16-JUN-18
Nickel (Ni)-Total			95.3		%		80-120	16-JUN-18
Potassium (K)-Total			99.3		%		80-120	16-JUN-18
Selenium (Se)-Total			97.7		%		80-120	16-JUN-18
Silicon (Si)-Total			99.9		%		80-120	16-JUN-18
Silver (Ag)-Total			98.1		%		80-120	16-JUN-18
Sodium (Na)-Total			96.4		%		80-120	16-JUN-18
Strontium (Sr)-Total			96.2		%		80-120	16-JUN-18
Thallium (Tl)-Total			99.1		%		80-120	16-JUN-18
Tin (Sn)-Total			96.8		%		80-120	16-JUN-18
Titanium (Ti)-Total			91.9		%		80-120	16-JUN-18
Uranium (U)-Total			96.9		%		80-120	16-JUN-18
Vanadium (V)-Total			94.2		%		80-120	16-JUN-18
Zinc (Zn)-Total			94.3		%		80-120	16-JUN-18
WG2796845-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	16-JUN-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Arsenic (As)-Total			0.00012	MB-LOR	mg/L		0.0001	16-JUN-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	16-JUN-18
Boron (B)-Total			<0.010		mg/L		0.01	16-JUN-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	16-JUN-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	16-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4088897								
WG2796845-1 MB								
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	16-JUN-18
Iron (Fe)-Total			<0.010		mg/L		0.01	16-JUN-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	16-JUN-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	16-JUN-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	16-JUN-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	16-JUN-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	16-JUN-18
Potassium (K)-Total			<0.050		mg/L		0.05	16-JUN-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	16-JUN-18
Silicon (Si)-Total			<0.10		mg/L		0.1	16-JUN-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	16-JUN-18
Sodium (Na)-Total			<0.050		mg/L		0.05	16-JUN-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	16-JUN-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	16-JUN-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	16-JUN-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	16-JUN-18
Vanadium (V)-Total			0.00064	MB-LOR	mg/L		0.0005	16-JUN-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	16-JUN-18
NH3-L-F-CL	**Water**							
Batch R4094436								
WG2803746-2 LCS								
Ammonia as N			101.8		%		85-115	21-JUN-18
WG2803746-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	21-JUN-18
NO2-L-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-10 LCS								
Nitrite (as N)			105.4		%		90-110	12-JUN-18
WG2796060-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	12-JUN-18
NO3-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-10 LCS								
Nitrate (as N)			101.8		%		90-110	12-JUN-18
WG2796060-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	12-JUN-18
ORP-CL	**Water**							
Batch R4112692								
WG2812872-1 CRM		**CL-ORP**						
ORP			219		mV		210-230	03-JUL-18
WG2812872-2 CRM		**CL-ORP**						
ORP			219		mV		210-230	03-JUL-18
P-T-L-COL-ED	**Water**							
Batch R4113733								
WG2813996-10 LCS								
Phosphorus (P)-Total			116.2		%		80-120	05-JUL-18
WG2813996-6 LCS								
Phosphorus (P)-Total			111.0		%		80-120	05-JUL-18
WG2813996-7 LCS								
Phosphorus (P)-Total			114.2		%		80-120	05-JUL-18
WG2813996-8 LCS								
Phosphorus (P)-Total			116.8		%		80-120	05-JUL-18
WG2813996-9 LCS								
Phosphorus (P)-Total			118.6		%		80-120	05-JUL-18
WG2813996-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	05-JUL-18
WG2813996-2 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	05-JUL-18
WG2813996-3 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	05-JUL-18
WG2813996-4 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	05-JUL-18
WG2813996-5 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	05-JUL-18
PH-CL	**Water**							
Batch R4095370								
WG2804813-20 LCS								
pH			7.01		pH		6.9-7.1	22-JUN-18
PO4-DO-L-COL-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-L-COL-CL	**Water**							
Batch R4082874								
WG2796136-2 LCS								
Orthophosphate-Dissolved (as P)			98.9		%		80-120	13-JUN-18
WG2796136-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	13-JUN-18
SO4-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-10 LCS								
Sulfate (SO4)			101.3		%		90-110	12-JUN-18
WG2796060-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	12-JUN-18
SOLIDS-TDS-CL	**Water**							
Batch R4086468								
WG2798118-8 LCS								
Total Dissolved Solids			96.1		%		85-115	15-JUN-18
WG2798118-7 MB								
Total Dissolved Solids			<10		mg/L		10	15-JUN-18
TKN-L-F-CL	**Water**							
Batch R4097744								
WG2807533-6 LCS								
Total Kjeldahl Nitrogen			92.3		%		75-125	26-JUN-18
WG2807533-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	26-JUN-18
TSS-L-CL	**Water**							
Batch R4084710								
WG2798782-8 LCS								
Total Suspended Solids			95.8		%		85-115	15-JUN-18
WG2798782-7 MB								
Total Suspended Solids			<1.0		mg/L		1	15-JUN-18
TURBIDITY-CL	**Water**							
Batch R4083327								
WG2796138-5 LCS								
Turbidity			99.5		%		85-115	13-JUN-18
WG2796138-4 MB								
Turbidity			<0.10		NTU		0.1	13-JUN-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	11-JUN-18 13:34	22-JUN-18 08:00	0.25	258	hours	EHTR-FM
	2	11-JUN-18 13:28	22-JUN-18 08:00	0.25	258	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2110527 were received on 12-JUN-18 09:45.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: GHO_WEK_WS_MAY28_2018 | TURNAROUND TIME

L2110527-COFC

PROJECT/CLIENT INFO				LAB				R INFO			
Facility Name / Job#	Greenhills Operation			Lab Name	ALS Cal				Excel	PDF	EDD
Project Manager	Jeremy Enns			Lab Contact	Lyudmyla			.com	X	X	X
Email	Jeremy.Enns@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com		Email 2:	Leigh.Stickney@teck.com	X	X	X
Address	P.O. BOX 5000			Address	2559 29 Street NE		Email 3:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Calgary	Province	AB	PO number			
Postal Code	V0B1H0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada				
Phone Number	250-865-3341			Phone Number	403 407 1794						

SAMPLE DETAILS								ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)												
								FIL	N			N	N	N	N	N	N			
								PRESERV.	NONE			NONE	H2SO4	NONE	NONE	HNO3	NONE			
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	HG-T-U-CVAF-VA			ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA			
1 GH_POTW15_WS_2018-06-11_N	GH_POTW15	WS		2018/06/11	13:34	G	7		1			1	1	1	1	1	1			
2 GH_POTW10_WS_2018-06-11_FD~~N~~	GH_POTW10	WS		2018/06/11	13:28	G	7		1			1	1	1	1	1	1			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
3 GH-POT15 RK 06/12/18				
4 GH-POT10				06/12 9:45

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

3 J

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
BOX 5000
ELKFORD BC V0B1H0

Date Received: 30-AUG-18
Report Date: 10-SEP-18 10:04 (MT)
Version: DRAFT

Client Phone: 250-865-3305

Certificate of Analysis

Lab Work Order #: L2156073

Project P.O. #: VPO00540380
Job Reference: GREENHILLS OPERATIONS
C of C Numbers: QTR_GW_2018-07-01_27
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156073-1 GH_POTW15_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18 @ 14:40							
Matrix: WG							
Alkalinity Species by Titration							
Alkalinity Species by Titration							
Alkalinity, Bicarbonate (as CaCO3)	241		1.0	mg/L		05-SEP-18	R4202956
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		05-SEP-18	R4202956
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		05-SEP-18	R4202956
Alkalinity, Total (as CaCO3)	241		1.0	mg/L		05-SEP-18	R4202956
Miscellaneous Parameters							
Acidity (as CaCO3)	5.9		1.0	mg/L		01-SEP-18	R4196308
Chloride (Cl)	33.5		0.50	mg/L		04-SEP-18	R4203293
Conductivity	916		2.0	uS/cm		01-SEP-18	R4196308
Total Kjeldahl Nitrogen	<0.050		0.050	mg/L		07-SEP-18	R4205297
pH	7.93		0.10	pH		01-SEP-18	R4196308
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	31-AUG-18	01-SEP-18	R4199797
Dissolved Metals Filtration Location	FIELD					31-AUG-18	R4195875
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	01-SEP-18	05-SEP-18	R4201050
Dissolved Mercury Filtration Location	FIELD					01-SEP-18	R4195953
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					31-AUG-18	R4195875
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	31-AUG-18	01-SEP-18	R4199797
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Arsenic (As)-Dissolved	0.00166		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Barium (Ba)-Dissolved	0.0225		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Boron (B)-Dissolved	0.019		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Cadmium (Cd)-Dissolved	0.0096		0.0050	ug/L	31-AUG-18	01-SEP-18	R4199797
Calcium (Ca)-Dissolved	127		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Cobalt (Co)-Dissolved	0.23		0.10	ug/L	31-AUG-18	01-SEP-18	R4199797
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	31-AUG-18	01-SEP-18	R4199797
Iron (Fe)-Dissolved	0.815		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Lithium (Li)-Dissolved	0.0146		0.0010	mg/L	31-AUG-18	01-SEP-18	R4199797
Magnesium (Mg)-Dissolved	46.8		0.10	mg/L	31-AUG-18	01-SEP-18	R4199797
Manganese (Mn)-Dissolved	0.190		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Molybdenum (Mo)-Dissolved	0.00240		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Nickel (Ni)-Dissolved	0.00121		0.00050	mg/L	31-AUG-18	01-SEP-18	R4199797
Potassium (K)-Dissolved	1.60		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	31-AUG-18	01-SEP-18	R4199797
Silicon (Si)-Dissolved	4.11		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Sodium (Na)-Dissolved	11.7		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Strontium (Sr)-Dissolved	0.373		0.00020	mg/L	31-AUG-18	01-SEP-18	R4199797
Thallium (Tl)-Dissolved	0.000016		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Uranium (U)-Dissolved	0.00145		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	31-AUG-18	01-SEP-18	R4199797
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	31-AUG-18	01-SEP-18	R4199797
Total Metals in Water							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156073-1 GH_POTW15_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18 @ 14:40							
Matrix: WG							
Hardness							
Hardness (as CaCO3)	509		0.50	mg/L		04-SEP-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		01-SEP-18	R4199127
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		05-SEP-18	R4203031
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0096		0.0030	mg/L		01-SEP-18	R4199127
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		01-SEP-18	R4199127
Arsenic (As)-Total	0.00178		0.00010	mg/L		01-SEP-18	R4199127
Barium (Ba)-Total	0.0230		0.00010	mg/L		01-SEP-18	R4199127
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		01-SEP-18	R4199127
Boron (B)-Total	0.020		0.010	mg/L		01-SEP-18	R4199127
Cadmium (Cd)-Total	0.0325		0.0050	ug/L		01-SEP-18	R4199127
Calcium (Ca)-Total	128		0.050	mg/L		01-SEP-18	R4199127
Chromium (Cr)-Total	<0.00040	DLB	0.00040	mg/L		01-SEP-18	R4199127
Cobalt (Co)-Total	0.25		0.10	ug/L		01-SEP-18	R4199127
Copper (Cu)-Total	0.00097		0.00050	mg/L		01-SEP-18	R4199127
Iron (Fe)-Total	0.903		0.010	mg/L		01-SEP-18	R4199127
Lead (Pb)-Total	0.000836		0.000050	mg/L		01-SEP-18	R4199127
Lithium (Li)-Total	0.0146		0.0010	mg/L		01-SEP-18	R4199127
Magnesium (Mg)-Total	46.4		0.10	mg/L		01-SEP-18	R4199127
Manganese (Mn)-Total	0.193		0.00010	mg/L		01-SEP-18	R4199127
Molybdenum (Mo)-Total	0.00253		0.000050	mg/L		01-SEP-18	R4199127
Nickel (Ni)-Total	0.00339		0.00050	mg/L		01-SEP-18	R4199127
Potassium (K)-Total	1.57		0.050	mg/L		01-SEP-18	R4199127
Selenium (Se)-Total	<0.050		0.050	ug/L		01-SEP-18	R4199127
Silicon (Si)-Total	4.26		0.10	mg/L		01-SEP-18	R4199127
Silver (Ag)-Total	<0.000010		0.000010	mg/L		01-SEP-18	R4199127
Sodium (Na)-Total	12.1		0.050	mg/L		01-SEP-18	R4199127
Strontium (Sr)-Total	0.407		0.00020	mg/L		01-SEP-18	R4199127
Thallium (Tl)-Total	0.000019		0.000010	mg/L		01-SEP-18	R4199127
Tin (Sn)-Total	0.00199		0.00010	mg/L		01-SEP-18	R4199127
Titanium (Ti)-Total	<0.010		0.010	mg/L		01-SEP-18	R4199127
Uranium (U)-Total	0.00145		0.000010	mg/L		01-SEP-18	R4199127
Vanadium (V)-Total	<0.00050		0.00050	mg/L		01-SEP-18	R4199127
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		01-SEP-18	R4199127
Routine for Teck Coal							
Ion Balance Calculation							
Ion Balance	91.0		-100	%		07-SEP-18	
Ion Balance Calculation							
Cation - Anion Balance	-4.7			%		07-SEP-18	
Anion Sum	11.8			meq/L		07-SEP-18	
Cation Sum	10.8			meq/L		07-SEP-18	
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		01-SEP-18	R4196670
Oxidation redution potential by elect.							
ORP	244		-1000	mV		09-SEP-18	R4205883
Total Dissolved Solids							
Total Dissolved Solids	636	DLHC	20	mg/L		04-SEP-18	R4202808
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		04-SEP-18	R4202812
Turbidity							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156073-1 GH_POTW15_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18 @ 14:40							
Matrix: WG							
Turbidity							
Turbidity	10.9		0.10	NTU		31-AUG-18	R4195909
Anions by Ion Chromatography							
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLDS	0.25	mg/L		04-SEP-18	R4203293
Fluoride in Water by IC							
Fluoride (F)	0.20		0.10	mg/L		04-SEP-18	R4203293
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	<0.025	DLDS	0.025	mg/L		04-SEP-18	R4203293
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0050	DLDS	0.0050	mg/L		04-SEP-18	R4203293
Sulfate in Water by IC							
Sulfate (SO4)	291		1.5	mg/L		04-SEP-18	R4203293
L2156073-2 GH_POTW10_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18 @ 14:00							
Matrix: WG							
Alkalinity Species by Titration							
Alkalinity Species by Titration							
Alkalinity, Bicarbonate (as CaCO3)	211		1.0	mg/L		05-SEP-18	R4202956
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		05-SEP-18	R4202956
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		05-SEP-18	R4202956
Alkalinity, Total (as CaCO3)	211		1.0	mg/L		05-SEP-18	R4202956
Miscellaneous Parameters							
Acidity (as CaCO3)	3.3		1.0	mg/L		01-SEP-18	R4196308
Chloride (Cl)	5.43		0.10	mg/L		04-SEP-18	R4203293
Conductivity	711		2.0	uS/cm		01-SEP-18	R4196308
Total Kjeldahl Nitrogen	0.076		0.050	mg/L		07-SEP-18	R4205297
pH	8.03		0.10	pH		01-SEP-18	R4196308
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	31-AUG-18	01-SEP-18	R4199797
Dissolved Metals Filtration Location	FIELD					31-AUG-18	R4195875
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	01-SEP-18	05-SEP-18	R4201050
Dissolved Mercury Filtration Location	FIELD					01-SEP-18	R4195953
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					31-AUG-18	R4195875
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	31-AUG-18	01-SEP-18	R4199797
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Arsenic (As)-Dissolved	0.00116		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Barium (Ba)-Dissolved	0.0183		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Boron (B)-Dissolved	0.034		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Cadmium (Cd)-Dissolved	0.0061		0.0050	ug/L	31-AUG-18	01-SEP-18	R4199797
Calcium (Ca)-Dissolved	88.2		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Cobalt (Co)-Dissolved	0.16		0.10	ug/L	31-AUG-18	01-SEP-18	R4199797
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	31-AUG-18	01-SEP-18	R4199797
Iron (Fe)-Dissolved	0.789		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Lead (Pb)-Dissolved	0.000070		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Lithium (Li)-Dissolved	0.0154		0.0010	mg/L	31-AUG-18	01-SEP-18	R4199797
Magnesium (Mg)-Dissolved	42.5		0.10	mg/L	31-AUG-18	01-SEP-18	R4199797

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156073-2 GH_POTW10_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18 @ 14:00							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Manganese (Mn)-Dissolved	0.0549		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Molybdenum (Mo)-Dissolved	0.00271		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Nickel (Ni)-Dissolved	0.00314		0.00050	mg/L	31-AUG-18	01-SEP-18	R4199797
Potassium (K)-Dissolved	1.78		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Selenium (Se)-Dissolved	2.73		0.050	ug/L	31-AUG-18	01-SEP-18	R4199797
Silicon (Si)-Dissolved	4.67		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Sodium (Na)-Dissolved	5.12		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Strontium (Sr)-Dissolved	0.495		0.00020	mg/L	31-AUG-18	01-SEP-18	R4199797
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Uranium (U)-Dissolved	0.000696		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	31-AUG-18	01-SEP-18	R4199797
Zinc (Zn)-Dissolved	0.0016		0.0010	mg/L	31-AUG-18	01-SEP-18	R4199797
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	395		0.50	mg/L		04-SEP-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		01-SEP-18	R4199127
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		05-SEP-18	R4203031
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		01-SEP-18	R4199127
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		01-SEP-18	R4199127
Arsenic (As)-Total	0.00124		0.00010	mg/L		01-SEP-18	R4199127
Barium (Ba)-Total	0.0189		0.00010	mg/L		01-SEP-18	R4199127
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		01-SEP-18	R4199127
Boron (B)-Total	0.037		0.010	mg/L		01-SEP-18	R4199127
Cadmium (Cd)-Total	0.0096		0.0050	ug/L		01-SEP-18	R4199127
Calcium (Ca)-Total	92.8		0.050	mg/L		01-SEP-18	R4199127
Chromium (Cr)-Total	<0.00030	DLB	0.00030	mg/L		01-SEP-18	R4199127
Cobalt (Co)-Total	0.17		0.10	ug/L		01-SEP-18	R4199127
Copper (Cu)-Total	<0.00050		0.00050	mg/L		01-SEP-18	R4199127
Iron (Fe)-Total	0.769		0.010	mg/L		01-SEP-18	R4199127
Lead (Pb)-Total	0.000101		0.000050	mg/L		01-SEP-18	R4199127
Lithium (Li)-Total	0.0162		0.0010	mg/L		01-SEP-18	R4199127
Magnesium (Mg)-Total	43.5		0.10	mg/L		01-SEP-18	R4199127
Manganese (Mn)-Total	0.0544		0.00010	mg/L		01-SEP-18	R4199127
Molybdenum (Mo)-Total	0.00299		0.000050	mg/L		01-SEP-18	R4199127
Nickel (Ni)-Total	0.00321		0.00050	mg/L		01-SEP-18	R4199127
Potassium (K)-Total	1.68		0.050	mg/L		01-SEP-18	R4199127
Selenium (Se)-Total	2.69		0.050	ug/L		01-SEP-18	R4199127
Silicon (Si)-Total	4.85		0.10	mg/L		01-SEP-18	R4199127
Silver (Ag)-Total	<0.000010		0.000010	mg/L		01-SEP-18	R4199127
Sodium (Na)-Total	5.20		0.050	mg/L		01-SEP-18	R4199127
Strontium (Sr)-Total	0.552		0.00020	mg/L		01-SEP-18	R4199127
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		01-SEP-18	R4199127
Tin (Sn)-Total	<0.00010		0.00010	mg/L		01-SEP-18	R4199127
Titanium (Ti)-Total	<0.010		0.010	mg/L		01-SEP-18	R4199127
Uranium (U)-Total	0.000712		0.000010	mg/L		01-SEP-18	R4199127
Vanadium (V)-Total	<0.00050		0.00050	mg/L		01-SEP-18	R4199127

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156073-2 GH_POTW10_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18 @ 14:00							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		01-SEP-18	R4199127
Routine for Teck Coal							
Ion Balance Calculation							
Cation - Anion Balance	-0.8			%		07-SEP-18	
Anion Sum	8.35			meq/L		07-SEP-18	
Cation Sum	8.21			meq/L		07-SEP-18	
Ion Balance Calculation							
Ion Balance	98.4		-100	%		07-SEP-18	
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		01-SEP-18	R4196670
Oxidation redution potential by elect.							
ORP	290		-1000	mV		09-SEP-18	R4205883
Total Dissolved Solids							
Total Dissolved Solids	502	DLHC	20	mg/L		04-SEP-18	R4202808
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		04-SEP-18	R4202812
Turbidity							
Turbidity	8.62		0.10	NTU		31-AUG-18	R4195909
Anions by Ion Chromatography							
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		04-SEP-18	R4203293
Fluoride in Water by IC							
Fluoride (F)	0.857		0.020	mg/L		04-SEP-18	R4203293
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.295		0.0050	mg/L		04-SEP-18	R4203293
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.0109		0.0010	mg/L		04-SEP-18	R4203293
Sulfate in Water by IC							
Sulfate (SO4)	188		0.30	mg/L		04-SEP-18	R4203293
L2156073-3 GH_GHLRP3_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18							
Matrix: WG							
Alkalinity Species by Titration							
Alkalinity Species by Titration							
Alkalinity, Bicarbonate (as CaCO3)	<1.0		1.0	mg/L		02-SEP-18	R4196317
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		02-SEP-18	R4196317
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		02-SEP-18	R4196317
Alkalinity, Total (as CaCO3)	<1.0		1.0	mg/L		02-SEP-18	R4196317
Miscellaneous Parameters							
Acidity (as CaCO3)	2.2	RRV	1.0	mg/L		04-SEP-18	R4200808
Chloride (Cl)	<0.10		0.10	mg/L		04-SEP-18	R4203293
Conductivity	<2.0		2.0	uS/cm		01-SEP-18	R4196308
Total Kjeldahl Nitrogen	<0.050		0.050	mg/L		07-SEP-18	R4205297
pH	5.71		0.10	pH		01-SEP-18	R4196308
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	31-AUG-18	01-SEP-18	R4199797
Dissolved Metals Filtration Location	FIELD					31-AUG-18	R4195875
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	01-SEP-18	05-SEP-18	R4201050
Dissolved Mercury Filtration Location	FIELD					01-SEP-18	R4195953

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156073-3 GH_GHLRP3_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					31-AUG-18	R4195875
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	31-AUG-18	01-SEP-18	R4199797
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Barium (Ba)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Boron (B)-Dissolved	<0.010		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Cadmium (Cd)-Dissolved	<0.0050		0.0050	ug/L	31-AUG-18	01-SEP-18	R4199797
Calcium (Ca)-Dissolved	<0.050		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	31-AUG-18	01-SEP-18	R4199797
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	31-AUG-18	01-SEP-18	R4199797
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Lithium (Li)-Dissolved	<0.0010		0.0010	mg/L	31-AUG-18	01-SEP-18	R4199797
Magnesium (Mg)-Dissolved	<0.10		0.10	mg/L	31-AUG-18	01-SEP-18	R4199797
Manganese (Mn)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Molybdenum (Mo)-Dissolved	<0.000050		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	31-AUG-18	01-SEP-18	R4199797
Potassium (K)-Dissolved	<0.050		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	31-AUG-18	01-SEP-18	R4199797
Silicon (Si)-Dissolved	<0.050		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Sodium (Na)-Dissolved	<0.050		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Strontium (Sr)-Dissolved	<0.00020		0.00020	mg/L	31-AUG-18	01-SEP-18	R4199797
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Uranium (U)-Dissolved	<0.000010		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	31-AUG-18	01-SEP-18	R4199797
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	31-AUG-18	01-SEP-18	R4199797
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	<0.50		0.50	mg/L		05-SEP-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		01-SEP-18	R4197794
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		05-SEP-18	R4203031
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		01-SEP-18	R4197794
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		01-SEP-18	R4197794
Arsenic (As)-Total	<0.00010		0.00010	mg/L		01-SEP-18	R4197794
Barium (Ba)-Total	<0.00010		0.00010	mg/L		01-SEP-18	R4197794
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		01-SEP-18	R4197794
Boron (B)-Total	<0.010		0.010	mg/L		01-SEP-18	R4197794
Cadmium (Cd)-Total	<0.0050		0.0050	ug/L		01-SEP-18	R4197794
Calcium (Ca)-Total	<0.050		0.050	mg/L		01-SEP-18	R4197794
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		01-SEP-18	R4197794
Cobalt (Co)-Total	<0.10		0.10	ug/L		01-SEP-18	R4197794
Copper (Cu)-Total	<0.00050		0.00050	mg/L		01-SEP-18	R4197794
Iron (Fe)-Total	<0.010		0.010	mg/L		01-SEP-18	R4197794
Lead (Pb)-Total	<0.000050		0.000050	mg/L		01-SEP-18	R4197794

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156073-3 GH_GHLRP3_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Lithium (Li)-Total	<0.0010		0.0010	mg/L		01-SEP-18	R4197794
Magnesium (Mg)-Total	<0.10		0.10	mg/L		01-SEP-18	R4197794
Manganese (Mn)-Total	0.00011	RRV	0.00010	mg/L		05-SEP-18	R4201797
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L		01-SEP-18	R4197794
Nickel (Ni)-Total	<0.00050		0.00050	mg/L		01-SEP-18	R4197794
Potassium (K)-Total	<0.050		0.050	mg/L		01-SEP-18	R4197794
Selenium (Se)-Total	<0.050		0.050	ug/L		01-SEP-18	R4197794
Silicon (Si)-Total	<0.10		0.10	mg/L		01-SEP-18	R4197794
Silver (Ag)-Total	<0.000010		0.000010	mg/L		01-SEP-18	R4197794
Sodium (Na)-Total	<0.050		0.050	mg/L		01-SEP-18	R4197794
Strontium (Sr)-Total	<0.00020		0.00020	mg/L		01-SEP-18	R4197794
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		01-SEP-18	R4197794
Tin (Sn)-Total	<0.00010		0.00010	mg/L		01-SEP-18	R4197794
Titanium (Ti)-Total	<0.010		0.010	mg/L		01-SEP-18	R4197794
Uranium (U)-Total	<0.000010		0.000010	mg/L		01-SEP-18	R4197794
Vanadium (V)-Total	<0.00050		0.00050	mg/L		01-SEP-18	R4197794
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		01-SEP-18	R4197794
Routine for Teck Coal							
Ion Balance Calculation							
Cation - Anion Balance	0.0			%		07-SEP-18	
Anion Sum	<0.10			meq/L		07-SEP-18	
Cation Sum	<0.10			meq/L		07-SEP-18	
Ion Balance Calculation							
Ion Balance	0.0		-100	%		07-SEP-18	
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		01-SEP-18	R4196670
Oxidation redution potential by elect.							
ORP	322		-1000	mV		09-SEP-18	R4205883
Total Dissolved Solids							
Total Dissolved Solids	<10		10	mg/L		04-SEP-18	R4202808
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		04-SEP-18	R4202812
Turbidity							
Turbidity	<0.10		0.10	NTU		31-AUG-18	R4195909
Anions by Ion Chromatography							
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		04-SEP-18	R4203293
Fluoride in Water by IC							
Fluoride (F)	<0.020		0.020	mg/L		04-SEP-18	R4203293
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	<0.0050		0.0050	mg/L		04-SEP-18	R4203293
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0010		0.0010	mg/L		04-SEP-18	R4203293
Sulfate in Water by IC							
Sulfate (SO4)	<0.30		0.30	mg/L		04-SEP-18	R4203293
L2156073-4 GH_GHER3_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18							
Matrix: WG							
Alkalinity Species by Titration							
Alkalinity Species by Titration							
Alkalinity, Bicarbonate (as CaCO3)	214		1.0	mg/L		05-SEP-18	R4202956
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		05-SEP-18	R4202956

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156073-4 GH_GHER3_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18							
Matrix: WG							
Alkalinity Species by Titration							
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		05-SEP-18	R4202956
Alkalinity, Total (as CaCO3)	214		1.0	mg/L		05-SEP-18	R4202956
Miscellaneous Parameters							
Acidity (as CaCO3)	3.7		1.0	mg/L		01-SEP-18	R4196308
Chloride (Cl)	5.42		0.10	mg/L		04-SEP-18	R4203293
Conductivity	718		2.0	uS/cm		01-SEP-18	R4196308
Total Kjeldahl Nitrogen	0.084		0.050	mg/L		07-SEP-18	R4205297
pH	8.01		0.10	pH		01-SEP-18	R4196308
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	31-AUG-18	01-SEP-18	R4199797
Dissolved Metals Filtration Location	FIELD					31-AUG-18	R4195875
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	01-SEP-18	05-SEP-18	R4201050
Dissolved Mercury Filtration Location	FIELD					01-SEP-18	R4195953
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-SEP-18	R4200254
Dissolved Metals Filtration Location	FIELD					31-AUG-18	R4195875
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	31-AUG-18	01-SEP-18	R4199797
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Arsenic (As)-Dissolved	0.00107		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Barium (Ba)-Dissolved	0.0183		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Boron (B)-Dissolved	0.033		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Cadmium (Cd)-Dissolved	<0.0050		0.0050	ug/L	31-AUG-18	01-SEP-18	R4199797
Calcium (Ca)-Dissolved	86.0		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Cobalt (Co)-Dissolved	0.15		0.10	ug/L	31-AUG-18	01-SEP-18	R4199797
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	31-AUG-18	01-SEP-18	R4199797
Iron (Fe)-Dissolved	0.837		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Lead (Pb)-Dissolved	0.000131		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Lithium (Li)-Dissolved	0.0154		0.0010	mg/L	31-AUG-18	01-SEP-18	R4199797
Magnesium (Mg)-Dissolved	42.6		0.10	mg/L	31-AUG-18	01-SEP-18	R4199797
Manganese (Mn)-Dissolved	0.0526		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Molybdenum (Mo)-Dissolved	0.00272		0.000050	mg/L	31-AUG-18	01-SEP-18	R4199797
Nickel (Ni)-Dissolved	0.00870	DTC	0.00050	mg/L	04-SEP-18	04-SEP-18	R4202787
Potassium (K)-Dissolved	1.68		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Selenium (Se)-Dissolved	2.61		0.050	ug/L	31-AUG-18	01-SEP-18	R4199797
Silicon (Si)-Dissolved	4.79		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Sodium (Na)-Dissolved	4.92		0.050	mg/L	31-AUG-18	01-SEP-18	R4199797
Strontium (Sr)-Dissolved	0.504		0.00020	mg/L	31-AUG-18	01-SEP-18	R4199797
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	31-AUG-18	01-SEP-18	R4199797
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	31-AUG-18	01-SEP-18	R4199797
Uranium (U)-Dissolved	0.000699		0.000010	mg/L	31-AUG-18	01-SEP-18	R4199797
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	31-AUG-18	01-SEP-18	R4199797
Zinc (Zn)-Dissolved	0.0039		0.0010	mg/L	31-AUG-18	01-SEP-18	R4199797
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	390		0.50	mg/L		05-SEP-18	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156073-4 GH_GHER3_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18							
Matrix: WG							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		01-SEP-18	R4197794
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		05-SEP-18	R4203031
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		01-SEP-18	R4197794
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		01-SEP-18	R4197794
Arsenic (As)-Total	0.00116		0.00010	mg/L		01-SEP-18	R4197794
Barium (Ba)-Total	0.0172		0.00010	mg/L		01-SEP-18	R4197794
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		01-SEP-18	R4197794
Boron (B)-Total	0.037		0.010	mg/L		01-SEP-18	R4197794
Cadmium (Cd)-Total	0.0085		0.0050	ug/L		01-SEP-18	R4197794
Calcium (Ca)-Total	89.8		0.050	mg/L		01-SEP-18	R4197794
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		01-SEP-18	R4197794
Cobalt (Co)-Total	0.15		0.10	ug/L		01-SEP-18	R4197794
Copper (Cu)-Total	<0.00050		0.00050	mg/L		01-SEP-18	R4197794
Iron (Fe)-Total	0.634		0.010	mg/L		01-SEP-18	R4197794
Lead (Pb)-Total	<0.000050		0.000050	mg/L		01-SEP-18	R4197794
Lithium (Li)-Total	0.0160		0.0010	mg/L		01-SEP-18	R4197794
Magnesium (Mg)-Total	40.4		0.10	mg/L		01-SEP-18	R4197794
Manganese (Mn)-Total	0.0533		0.00010	mg/L		01-SEP-18	R4197794
Molybdenum (Mo)-Total	0.00285		0.000050	mg/L		01-SEP-18	R4197794
Nickel (Ni)-Total	0.00139		0.00050	mg/L		01-SEP-18	R4197794
Potassium (K)-Total	1.59		0.050	mg/L		01-SEP-18	R4197794
Selenium (Se)-Total	2.55		0.050	ug/L		01-SEP-18	R4197794
Silicon (Si)-Total	4.63		0.10	mg/L		01-SEP-18	R4197794
Silver (Ag)-Total	<0.000010		0.000010	mg/L		01-SEP-18	R4197794
Sodium (Na)-Total	5.05		0.050	mg/L		01-SEP-18	R4197794
Strontium (Sr)-Total	0.509		0.00020	mg/L		01-SEP-18	R4197794
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		01-SEP-18	R4197794
Tin (Sn)-Total	<0.00010		0.00010	mg/L		01-SEP-18	R4197794
Titanium (Ti)-Total	<0.010		0.010	mg/L		01-SEP-18	R4197794
Uranium (U)-Total	0.000728		0.000010	mg/L		01-SEP-18	R4197794
Vanadium (V)-Total	<0.00050		0.00050	mg/L		01-SEP-18	R4197794
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		01-SEP-18	R4197794
Routine for Teck Coal							
Ion Balance Calculation							
Ion Balance	96.3		-100	%		07-SEP-18	
Ion Balance Calculation							
Cation - Anion Balance	-1.9			%		07-SEP-18	
Anion Sum	8.41			meq/L		07-SEP-18	
Cation Sum	8.10			meq/L		07-SEP-18	
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		01-SEP-18	R4196670
Oxidation redution potential by elect.							
ORP	294		-1000	mV		09-SEP-18	R4205883
Total Dissolved Solids							
Total Dissolved Solids	489	DLHC	20	mg/L		04-SEP-18	R4202808
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		04-SEP-18	R4202812
Turbidity							
Turbidity	7.91		0.10	NTU		31-AUG-18	R4195909
Anions by Ion Chromatography							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2156073-4 GH_GHER3_WG_2018-07-01_NP							
Sampled By: CLIENT on 29-AUG-18							
Matrix: WG							
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		04-SEP-18	R4203293
Fluoride in Water by IC							
Fluoride (F)	0.846		0.020	mg/L		04-SEP-18	R4203293
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.294		0.0050	mg/L		04-SEP-18	R4203293
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.0111		0.0010	mg/L		04-SEP-18	R4203293
Sulfate in Water by IC							
Sulfate (SO4)	188		0.30	mg/L		04-SEP-18	R4203293

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

QTR_GW_2018-07-01_27

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2156073 Report Date: 10-SEP-18

Client: TECK COAL LIMITED (GREENHILLS)
BOX 5000
ELKFORD BC V0B1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4196308								
WG2866008-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			100.8		%		85-115	01-SEP-18
WG2866008-1 MB								
Acidity (as CaCO3)			1.6		mg/L		2	01-SEP-18
Batch R4200808								
WG2867245-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			104.9		%		85-115	04-SEP-18
WG2867245-1 MB								
Acidity (as CaCO3)			1.8		mg/L		2	04-SEP-18
ALK-TITR-VA	**Water**							
Batch R4196317								
WG2866003-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			101.6		%		85-115	01-SEP-18
WG2866003-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	01-SEP-18
Batch R4202956								
WG2867236-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			100.8		%		85-115	05-SEP-18
WG2867236-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	05-SEP-18
BE-D-L-CCMS-VA	**Water**							
Batch R4199797								
WG2865842-3 DUP		**L2156073-2**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	01-SEP-18
WG2865842-2 LCS								
Beryllium (Be)-Dissolved			94.0		%		80-120	01-SEP-18
WG2865842-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	01-SEP-18
WG2865842-4 MS		**L2156073-1**						
Beryllium (Be)-Dissolved			92.8		%		70-130	01-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4197794								
WG2865811-2 LCS								
Beryllium (Be)-Total			97.7		%		80-120	01-SEP-18
WG2865811-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	01-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BE-T-L-CCMS-VA	**Water**							
Batch R4199127								
WG2865809-2 LCS								
Beryllium (Be)-Total			97.4		%		80-120	01-SEP-18
WG2865809-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	01-SEP-18
BR-L-IC-N-VA	**Water**							
Batch R4203293								
WG2866002-3 DUP		**L2156073-4**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	04-SEP-18
WG2866002-2 LCS								
Bromide (Br)			102.0		%		85-115	04-SEP-18
WG2866002-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	04-SEP-18
WG2866002-4 MS		**L2156073-2**						
Bromide (Br)			98.6		%		75-125	04-SEP-18
CL-L-IC-N-VA	**Water**							
Batch R4203293								
WG2866002-3 DUP		**L2156073-4**						
Chloride (Cl)		5.42	5.44		mg/L	0.3	20	04-SEP-18
WG2866002-2 LCS								
Chloride (Cl)			99.7		%		90-110	04-SEP-18
WG2866002-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	04-SEP-18
WG2866002-4 MS		**L2156073-2**						
Chloride (Cl)			96.5		%		75-125	04-SEP-18
EC-PCT-VA	**Water**							
Batch R4196317								
WG2866003-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			100.8		%		90-110	01-SEP-18
WG2866003-1 MB								
Conductivity			<2.0		uS/cm		2	01-SEP-18
F-IC-N-VA	**Water**							
Batch R4203293								
WG2866002-3 DUP		**L2156073-4**						
Fluoride (F)		0.846	0.848		mg/L	0.2	20	04-SEP-18
WG2866002-2 LCS								
Fluoride (F)			100.2		%		90-110	04-SEP-18
WG2866002-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-VA	**Water**							
Batch R4203293								
WG2866002-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	04-SEP-18
WG2866002-4 MS		**L2156073-2**						
Fluoride (F)			93.0		%		75-125	04-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4200308								
WG2865964-2 LCS								
Mercury (Hg)-Dissolved			102.8		%		80-120	04-SEP-18
Batch R4201050								
WG2865964-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	05-SEP-18
HG-T-CVAA-VA	**Water**							
Batch R4203031								
WG2868487-2 LCS								
Mercury (Hg)-Total			101.0		%		80-120	05-SEP-18
WG2868487-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	05-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4199797								
WG2865842-3 DUP		**L2156073-2**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	01-SEP-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	01-SEP-18
Arsenic (As)-Dissolved		0.00116	0.00111		mg/L	4.4	20	01-SEP-18
Barium (Ba)-Dissolved		0.0183	0.0182		mg/L	0.9	20	01-SEP-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	01-SEP-18
Boron (B)-Dissolved		0.034	0.033		mg/L	2.1	20	01-SEP-18
Cadmium (Cd)-Dissolved		0.0000061	0.0000070		mg/L	14	20	01-SEP-18
Calcium (Ca)-Dissolved		88.2	86.5		mg/L	1.9	20	01-SEP-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	01-SEP-18
Cobalt (Co)-Dissolved		0.00016	0.00016		mg/L	1.2	20	01-SEP-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	01-SEP-18
Iron (Fe)-Dissolved		0.789	0.764		mg/L	3.2	20	01-SEP-18
Lead (Pb)-Dissolved		0.000070	0.000069		mg/L	1.5	20	01-SEP-18
Lithium (Li)-Dissolved		0.0154	0.0158		mg/L	2.6	20	01-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4199797								
WG2865842-3 DUP		**L2156073-2**						
Magnesium (Mg)-Dissolved		42.5	41.8		mg/L	1.7	20	01-SEP-18
Manganese (Mn)-Dissolved		0.0549	0.0533		mg/L	3.0	20	01-SEP-18
Molybdenum (Mo)-Dissolved		0.00271	0.00272		mg/L	0.4	20	01-SEP-18
Nickel (Ni)-Dissolved		0.00314	0.00304		mg/L	3.0	20	01-SEP-18
Potassium (K)-Dissolved		1.78	1.75		mg/L	2.0	20	01-SEP-18
Selenium (Se)-Dissolved		0.00273	0.00269		mg/L	1.5	20	01-SEP-18
Silicon (Si)-Dissolved		4.67	4.47		mg/L	4.4	20	01-SEP-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	01-SEP-18
Sodium (Na)-Dissolved		5.12	5.08		mg/L	0.7	20	01-SEP-18
Strontium (Sr)-Dissolved		0.495	0.504		mg/L	1.8	20	01-SEP-18
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	01-SEP-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	01-SEP-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	01-SEP-18
Uranium (U)-Dissolved		0.000696	0.000692		mg/L	0.6	20	01-SEP-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	01-SEP-18
Zinc (Zn)-Dissolved		0.0016	0.0017		mg/L	1.7	20	01-SEP-18
WG2865842-2 LCS								
Aluminum (Al)-Dissolved			97.6		%		80-120	01-SEP-18
Antimony (Sb)-Dissolved			93.5		%		80-120	01-SEP-18
Arsenic (As)-Dissolved			96.1		%		80-120	01-SEP-18
Barium (Ba)-Dissolved			96.5		%		80-120	01-SEP-18
Bismuth (Bi)-Dissolved			95.1		%		80-120	01-SEP-18
Boron (B)-Dissolved			91.8		%		80-120	01-SEP-18
Cadmium (Cd)-Dissolved			93.1		%		80-120	01-SEP-18
Calcium (Ca)-Dissolved			94.4		%		80-120	01-SEP-18
Chromium (Cr)-Dissolved			97.2		%		80-120	01-SEP-18
Cobalt (Co)-Dissolved			97.7		%		80-120	01-SEP-18
Copper (Cu)-Dissolved			94.6		%		80-120	01-SEP-18
Iron (Fe)-Dissolved			100.9		%		80-120	01-SEP-18
Lead (Pb)-Dissolved			94.8		%		80-120	01-SEP-18
Lithium (Li)-Dissolved			97.1		%		80-120	01-SEP-18
Magnesium (Mg)-Dissolved			105.2		%		80-120	01-SEP-18
Manganese (Mn)-Dissolved			95.2		%		80-120	01-SEP-18
Molybdenum (Mo)-Dissolved			96.9		%		80-120	01-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4199797								
WG2865842-2 LCS								
Nickel (Ni)-Dissolved			95.1		%		80-120	01-SEP-18
Potassium (K)-Dissolved			99.2		%		80-120	01-SEP-18
Selenium (Se)-Dissolved			97.0		%		80-120	01-SEP-18
Silicon (Si)-Dissolved			99.0		%		60-140	01-SEP-18
Silver (Ag)-Dissolved			92.2		%		80-120	01-SEP-18
Sodium (Na)-Dissolved			102.7		%		80-120	01-SEP-18
Strontium (Sr)-Dissolved			99.2		%		80-120	01-SEP-18
Thallium (Tl)-Dissolved			95.1		%		80-120	01-SEP-18
Tin (Sn)-Dissolved			93.4		%		80-120	01-SEP-18
Titanium (Ti)-Dissolved			90.0		%		80-120	01-SEP-18
Uranium (U)-Dissolved			101.0		%		80-120	01-SEP-18
Vanadium (V)-Dissolved			96.8		%		80-120	01-SEP-18
Zinc (Zn)-Dissolved			88.7		%		80-120	01-SEP-18
WG2865842-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	01-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	01-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	01-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	01-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	01-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	01-SEP-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	01-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	01-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	01-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	01-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	01-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	01-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	01-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	01-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	01-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	01-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	01-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	01-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	01-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	01-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4199797								
WG2865842-1 MB		**NP**						
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	01-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	01-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	01-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	01-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	01-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	01-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	01-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	01-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	01-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	01-SEP-18
WG2865842-4 MS		**L2156073-1**						
Aluminum (Al)-Dissolved			95.4		%		70-130	01-SEP-18
Antimony (Sb)-Dissolved			99.5		%		70-130	01-SEP-18
Arsenic (As)-Dissolved			102.2		%		70-130	01-SEP-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	01-SEP-18
Bismuth (Bi)-Dissolved			90.1		%		70-130	01-SEP-18
Boron (B)-Dissolved			91.0		%		70-130	01-SEP-18
Cadmium (Cd)-Dissolved			96.1		%		70-130	01-SEP-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	01-SEP-18
Chromium (Cr)-Dissolved			98.8		%		70-130	01-SEP-18
Cobalt (Co)-Dissolved			93.1		%		70-130	01-SEP-18
Copper (Cu)-Dissolved			91.4		%		70-130	01-SEP-18
Iron (Fe)-Dissolved			93.8		%		70-130	01-SEP-18
Lead (Pb)-Dissolved			93.8		%		70-130	01-SEP-18
Lithium (Li)-Dissolved			96.6		%		70-130	01-SEP-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	01-SEP-18
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	01-SEP-18
Molybdenum (Mo)-Dissolved			96.6		%		70-130	01-SEP-18
Nickel (Ni)-Dissolved			91.4		%		70-130	01-SEP-18
Potassium (K)-Dissolved			99.5		%		70-130	01-SEP-18
Selenium (Se)-Dissolved			105.7		%		70-130	01-SEP-18
Silicon (Si)-Dissolved			92.0		%		70-130	01-SEP-18
Silver (Ag)-Dissolved			95.5		%		70-130	01-SEP-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	01-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4199797								
WG2865842-4 MS		**L2156073-1**						
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	01-SEP-18
Thallium (Tl)-Dissolved			93.9		%		70-130	01-SEP-18
Tin (Sn)-Dissolved			97.9		%		70-130	01-SEP-18
Titanium (Ti)-Dissolved			94.6		%		70-130	01-SEP-18
Uranium (U)-Dissolved			99.96		%		70-130	01-SEP-18
Vanadium (V)-Dissolved			98.5		%		70-130	01-SEP-18
Zinc (Zn)-Dissolved			87.0		%		70-130	01-SEP-18
Batch R4202787								
WG2867604-2 LCS								
Aluminum (Al)-Dissolved			102.4		%		80-120	04-SEP-18
Antimony (Sb)-Dissolved			94.2		%		80-120	04-SEP-18
Arsenic (As)-Dissolved			100.5		%		80-120	04-SEP-18
Barium (Ba)-Dissolved			97.4		%		80-120	04-SEP-18
Bismuth (Bi)-Dissolved			90.8		%		80-120	04-SEP-18
Boron (B)-Dissolved			91.4		%		80-120	04-SEP-18
Cadmium (Cd)-Dissolved			98.1		%		80-120	04-SEP-18
Calcium (Ca)-Dissolved			93.8		%		80-120	04-SEP-18
Chromium (Cr)-Dissolved			92.5		%		80-120	04-SEP-18
Cobalt (Co)-Dissolved			99.0		%		80-120	04-SEP-18
Copper (Cu)-Dissolved			97.6		%		80-120	04-SEP-18
Iron (Fe)-Dissolved			97.4		%		80-120	04-SEP-18
Lead (Pb)-Dissolved			92.8		%		80-120	04-SEP-18
Lithium (Li)-Dissolved			93.6		%		80-120	04-SEP-18
Magnesium (Mg)-Dissolved			101.8		%		80-120	04-SEP-18
Manganese (Mn)-Dissolved			97.3		%		80-120	04-SEP-18
Molybdenum (Mo)-Dissolved			96.2		%		80-120	04-SEP-18
Nickel (Ni)-Dissolved			98.1		%		80-120	04-SEP-18
Potassium (K)-Dissolved			100.1		%		80-120	04-SEP-18
Selenium (Se)-Dissolved			93.8		%		80-120	04-SEP-18
Silicon (Si)-Dissolved			96.6		%		60-140	04-SEP-18
Silver (Ag)-Dissolved			93.9		%		80-120	04-SEP-18
Sodium (Na)-Dissolved			100.1		%		80-120	04-SEP-18
Strontium (Sr)-Dissolved			93.5		%		80-120	04-SEP-18
Thallium (Tl)-Dissolved			91.6		%		80-120	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4202787								
WG2867604-2 LCS								
Tin (Sn)-Dissolved			97.8		%		80-120	04-SEP-18
Titanium (Ti)-Dissolved			97.0		%		80-120	04-SEP-18
Uranium (U)-Dissolved			88.8		%		80-120	04-SEP-18
Vanadium (V)-Dissolved			100.3		%		80-120	04-SEP-18
Zinc (Zn)-Dissolved			92.1		%		80-120	04-SEP-18
WG2867604-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	04-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	04-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	04-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	04-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	04-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4202787								
WG2867604-1 MB		**NP**						
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4197794								
WG2865811-2 LCS								
Aluminum (Al)-Total			99.4		%		80-120	01-SEP-18
Antimony (Sb)-Total			97.9		%		80-120	01-SEP-18
Arsenic (As)-Total			99.8		%		80-120	01-SEP-18
Barium (Ba)-Total			95.1		%		80-120	01-SEP-18
Bismuth (Bi)-Total			101.2		%		80-120	01-SEP-18
Boron (B)-Total			98.0		%		80-120	01-SEP-18
Cadmium (Cd)-Total			97.5		%		80-120	01-SEP-18
Calcium (Ca)-Total			96.9		%		80-120	01-SEP-18
Chromium (Cr)-Total			99.7		%		80-120	01-SEP-18
Cobalt (Co)-Total			95.7		%		80-120	01-SEP-18
Copper (Cu)-Total			96.6		%		80-120	01-SEP-18
Iron (Fe)-Total			97.7		%		80-120	01-SEP-18
Lead (Pb)-Total			100.5		%		80-120	01-SEP-18
Lithium (Li)-Total			100.9		%		80-120	01-SEP-18
Magnesium (Mg)-Total			102.5		%		80-120	01-SEP-18
Manganese (Mn)-Total			99.1		%		80-120	01-SEP-18
Molybdenum (Mo)-Total			96.9		%		80-120	01-SEP-18
Nickel (Ni)-Total			96.7		%		80-120	01-SEP-18
Potassium (K)-Total			98.5		%		80-120	01-SEP-18
Selenium (Se)-Total			98.3		%		80-120	01-SEP-18
Silicon (Si)-Total			97.6		%		80-120	01-SEP-18
Silver (Ag)-Total			91.3		%		80-120	01-SEP-18
Sodium (Na)-Total			105.4		%		80-120	01-SEP-18
Strontium (Sr)-Total			99.9		%		80-120	01-SEP-18
Thallium (Tl)-Total			97.8		%		80-120	01-SEP-18
Tin (Sn)-Total			96.7		%		80-120	01-SEP-18
Titanium (Ti)-Total			98.1		%		80-120	01-SEP-18
Uranium (U)-Total			103.2		%		80-120	01-SEP-18
Vanadium (V)-Total			100.3		%		80-120	01-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4197794								
WG2865811-2 LCS								
Zinc (Zn)-Total			99.7		%		80-120	01-SEP-18
WG2865811-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	01-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	01-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	01-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	01-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	01-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	01-SEP-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	01-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	01-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	01-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	01-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	01-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	01-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	01-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	01-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	01-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	01-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	01-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	01-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	01-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	01-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	01-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	01-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	01-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	01-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	01-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	01-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	01-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	01-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	01-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	01-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4199127								
WG2865809-2 LCS								
Aluminum (Al)-Total			99.2		%		80-120	01-SEP-18
Antimony (Sb)-Total			105.2		%		80-120	01-SEP-18
Arsenic (As)-Total			95.7		%		80-120	01-SEP-18
Barium (Ba)-Total			105.0		%		80-120	01-SEP-18
Bismuth (Bi)-Total			102.2		%		80-120	01-SEP-18
Boron (B)-Total			94.6		%		80-120	01-SEP-18
Cadmium (Cd)-Total			93.3		%		80-120	01-SEP-18
Calcium (Ca)-Total			90.9		%		80-120	01-SEP-18
Chromium (Cr)-Total			92.6		%		80-120	01-SEP-18
Cobalt (Co)-Total			91.7		%		80-120	01-SEP-18
Copper (Cu)-Total			91.5		%		80-120	01-SEP-18
Iron (Fe)-Total			93.2		%		80-120	01-SEP-18
Lead (Pb)-Total			98.4		%		80-120	01-SEP-18
Lithium (Li)-Total			95.7		%		80-120	01-SEP-18
Magnesium (Mg)-Total			99.4		%		80-120	01-SEP-18
Manganese (Mn)-Total			95.5		%		80-120	01-SEP-18
Molybdenum (Mo)-Total			99.3		%		80-120	01-SEP-18
Nickel (Ni)-Total			90.0		%		80-120	01-SEP-18
Potassium (K)-Total			101.8		%		80-120	01-SEP-18
Selenium (Se)-Total			97.0		%		80-120	01-SEP-18
Silicon (Si)-Total			92.0		%		80-120	01-SEP-18
Silver (Ag)-Total			95.3		%		80-120	01-SEP-18
Sodium (Na)-Total			99.1		%		80-120	01-SEP-18
Strontium (Sr)-Total			95.3		%		80-120	01-SEP-18
Thallium (Tl)-Total			98.8		%		80-120	01-SEP-18
Tin (Sn)-Total			94.8		%		80-120	01-SEP-18
Titanium (Ti)-Total			97.4		%		80-120	01-SEP-18
Uranium (U)-Total			98.2		%		80-120	01-SEP-18
Vanadium (V)-Total			97.3		%		80-120	01-SEP-18
Zinc (Zn)-Total			89.7		%		80-120	01-SEP-18
WG2865809-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	01-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	01-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	01-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4199127								
WG2865809-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	01-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	01-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	01-SEP-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	01-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	01-SEP-18
Chromium (Cr)-Total			0.00315	MB-LOR	mg/L		0.0001	01-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	01-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	01-SEP-18
Iron (Fe)-Total			0.034	MB-LOR	mg/L		0.01	01-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	01-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	01-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	01-SEP-18
Manganese (Mn)-Total			0.00028	MB-LOR	mg/L		0.0001	01-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	01-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	01-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	01-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	01-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	01-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	01-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	01-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	01-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	01-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	01-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	01-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	01-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	01-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	01-SEP-18
Batch R4200610								
WG2867109-2 LCS								
Aluminum (Al)-Total			96.2		%		80-120	04-SEP-18
Antimony (Sb)-Total			97.8		%		80-120	04-SEP-18
Arsenic (As)-Total			94.3		%		80-120	04-SEP-18
Barium (Ba)-Total			90.9		%		80-120	04-SEP-18
Bismuth (Bi)-Total			87.9		%		80-120	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4200610								
WG2867109-2 LCS								
Boron (B)-Total			95.6		%		80-120	04-SEP-18
Cadmium (Cd)-Total			95.4		%		80-120	04-SEP-18
Calcium (Ca)-Total			91.7		%		80-120	04-SEP-18
Chromium (Cr)-Total			94.7		%		80-120	04-SEP-18
Cobalt (Co)-Total			95.0		%		80-120	04-SEP-18
Copper (Cu)-Total			94.1		%		80-120	04-SEP-18
Iron (Fe)-Total			95.6		%		80-120	04-SEP-18
Lead (Pb)-Total			90.7		%		80-120	04-SEP-18
Lithium (Li)-Total			92.6		%		80-120	04-SEP-18
Magnesium (Mg)-Total			98.2		%		80-120	04-SEP-18
Molybdenum (Mo)-Total			97.0		%		80-120	04-SEP-18
Nickel (Ni)-Total			94.1		%		80-120	04-SEP-18
Potassium (K)-Total			98.5		%		80-120	04-SEP-18
Selenium (Se)-Total			100.4		%		80-120	04-SEP-18
Silicon (Si)-Total			95.0		%		80-120	04-SEP-18
Silver (Ag)-Total			91.3		%		80-120	04-SEP-18
Sodium (Na)-Total			97.8		%		80-120	04-SEP-18
Strontium (Sr)-Total			95.5		%		80-120	04-SEP-18
Thallium (Tl)-Total			89.8		%		80-120	04-SEP-18
Tin (Sn)-Total			95.5		%		80-120	04-SEP-18
Titanium (Ti)-Total			89.9		%		80-120	04-SEP-18
Uranium (U)-Total			92.5		%		80-120	04-SEP-18
Vanadium (V)-Total			95.0		%		80-120	04-SEP-18
Zinc (Zn)-Total			92.2		%		80-120	04-SEP-18
WG2867109-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	04-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	04-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	04-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	04-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	04-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	04-SEP-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	04-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	04-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4200610								
WG2867109-1 MB								
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	04-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	04-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	04-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	04-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	04-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	04-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	04-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	04-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	04-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	04-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	04-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	04-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	04-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	04-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	04-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	04-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	04-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	04-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	04-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	04-SEP-18
Batch R4201797								
WG2867779-2 LCS								
Aluminum (Al)-Total			91.1		%		80-120	05-SEP-18
Antimony (Sb)-Total			99.4		%		80-120	05-SEP-18
Arsenic (As)-Total			95.3		%		80-120	05-SEP-18
Barium (Ba)-Total			90.1		%		80-120	05-SEP-18
Bismuth (Bi)-Total			93.3		%		80-120	05-SEP-18
Boron (B)-Total			93.8		%		80-120	05-SEP-18
Cadmium (Cd)-Total			92.9		%		80-120	05-SEP-18
Calcium (Ca)-Total			92.0		%		80-120	05-SEP-18
Chromium (Cr)-Total			91.7		%		80-120	05-SEP-18
Cobalt (Co)-Total			92.9		%		80-120	05-SEP-18
Copper (Cu)-Total			93.3		%		80-120	05-SEP-18
Iron (Fe)-Total			92.8		%		80-120	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4201797								
WG2867779-2 LCS								
Lead (Pb)-Total			97.6		%		80-120	05-SEP-18
Lithium (Li)-Total			93.8		%		80-120	05-SEP-18
Magnesium (Mg)-Total			93.3		%		80-120	05-SEP-18
Manganese (Mn)-Total			90.9		%		80-120	05-SEP-18
Molybdenum (Mo)-Total			97.9		%		80-120	05-SEP-18
Nickel (Ni)-Total			90.9		%		80-120	05-SEP-18
Potassium (K)-Total			90.3		%		80-120	05-SEP-18
Selenium (Se)-Total			95.5		%		80-120	05-SEP-18
Silicon (Si)-Total			96.6		%		80-120	05-SEP-18
Silver (Ag)-Total			92.7		%		80-120	05-SEP-18
Sodium (Na)-Total			91.2		%		80-120	05-SEP-18
Strontium (Sr)-Total			92.8		%		80-120	05-SEP-18
Thallium (Tl)-Total			97.2		%		80-120	05-SEP-18
Tin (Sn)-Total			96.9		%		80-120	05-SEP-18
Titanium (Ti)-Total			92.9		%		80-120	05-SEP-18
Uranium (U)-Total			100.5		%		80-120	05-SEP-18
Vanadium (V)-Total			92.9		%		80-120	05-SEP-18
Zinc (Zn)-Total			90.7		%		80-120	05-SEP-18
WG2867779-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	05-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	05-SEP-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	05-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	05-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	05-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	05-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4201797								
WG2867779-1 MB								
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	05-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	05-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	05-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	05-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	05-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	05-SEP-18
NO2-L-IC-N-VA	**Water**							
Batch R4203293								
WG2866002-3 DUP		**L2156073-4**						
Nitrite (as N)		0.0111	0.0117		mg/L	5.8	20	04-SEP-18
WG2866002-2 LCS								
Nitrite (as N)			100.0		%		90-110	04-SEP-18
WG2866002-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	04-SEP-18
WG2866002-4 MS		**L2156073-2**						
Nitrite (as N)			91.8		%		75-125	04-SEP-18
NO3-L-IC-N-VA	**Water**							
Batch R4203293								
WG2866002-3 DUP		**L2156073-4**						
Nitrate (as N)		0.294	0.294		mg/L	0.1	20	04-SEP-18
WG2866002-2 LCS								
Nitrate (as N)			99.6		%		90-110	04-SEP-18
WG2866002-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	04-SEP-18
WG2866002-4 MS		**L2156073-2**						
Nitrate (as N)			96.9		%		75-125	04-SEP-18
ORP-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ORP-CL	**Water**							
Batch R4205883								
WG2871709-5 CRM		**CL-ORP**						
ORP			226		mV		210-230	09-SEP-18
PH-PCT-VA	**Water**							
Batch R4196317								
WG2866003-2 CRM		**VA-PH7-BUF**						
pH			7.00		pH		6.9-7.1	01-SEP-18
PO4-DO-L-COL-CL	**Water**							
Batch R4196670								
WG2866156-2 LCS								
Orthophosphate-Dissolved (as P)			97.3		%		80-120	01-SEP-18
WG2866156-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	01-SEP-18
SO4-IC-N-VA	**Water**							
Batch R4203293								
WG2866002-3 DUP		**L2156073-4**						
Sulfate (SO4)		188	189		mg/L	0.3	20	04-SEP-18
WG2866002-2 LCS								
Sulfate (SO4)			100.4		%		90-110	04-SEP-18
WG2866002-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	04-SEP-18
WG2866002-4 MS		**L2156073-2**						
Sulfate (SO4)			N/A	MS-B	%		-	04-SEP-18
SOLIDS-TDS-CL	**Water**							
Batch R4202808								
WG2866943-8 LCS								
Total Dissolved Solids			102.2		%		85-115	04-SEP-18
WG2866943-7 MB								
Total Dissolved Solids			<10		mg/L		10	04-SEP-18
TKN-L-F-CL	**Water**							
Batch R4205297								
WG2871074-14 LCS								
Total Kjeldahl Nitrogen			109.7		%		75-125	07-SEP-18
WG2871074-13 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	07-SEP-18
TSS-L-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-L-CL	**Water**							
Batch R4202812								
WG2867552-8 LCS								
Total Suspended Solids			93.1		%		85-115	04-SEP-18
WG2867552-7 MB								
Total Suspended Solids			<1.0		mg/L		1	04-SEP-18
TURBIDITY-CL	**Water**							
Batch R4195909								
WG2865196-2 LCS								
Turbidity			97.5		%		85-115	31-AUG-18
WG2865196-1 MB								
Turbidity			<0.10		NTU		0.1	31-AUG-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	29-AUG-18 14:40	09-SEP-18 08:45	0.25	258	hours	EHTR-FM
	2	29-AUG-18 14:00	09-SEP-18 08:45	0.25	259	hours	EHTR-FM
	3	29-AUG-18	09-SEP-18 08:45	0.25	261	hours	EHTR-FM
	4	29-AUG-18	09-SEP-18 08:45	0.25	261	hours	EHTR-FM
pH by Meter (Automated)							
	1	29-AUG-18 14:40	01-SEP-18 09:24	0.25	67	hours	EHTR-FM
	2	29-AUG-18 14:00	01-SEP-18 09:24	0.25	67	hours	EHTR-FM
	3	29-AUG-18	01-SEP-18 09:24	0.25	69	hours	EHTR-FM
	4	29-AUG-18	01-SEP-18 09:24	0.25	69	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	29-AUG-18 14:40	04-SEP-18 07:18	3	6	days	EHT
	2	29-AUG-18 14:00	04-SEP-18 07:18	3	6	days	EHT
	3	29-AUG-18	04-SEP-18 07:18	3	6	days	EHT
	4	29-AUG-18	04-SEP-18 07:18	3	6	days	EHT
Nitrite in Water by IC (Low Level)							
	1	29-AUG-18 14:40	04-SEP-18 07:18	3	6	days	EHT
	2	29-AUG-18 14:00	04-SEP-18 07:18	3	6	days	EHT
	3	29-AUG-18	04-SEP-18 07:18	3	6	days	EHT
	4	29-AUG-18	04-SEP-18 07:18	3	6	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2156073 were received on 30-AUG-18 09:15.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

Page 1 of

L2156073-COFC

COC ID: QTR_GW_2018-07-01_27

TURNAROUND TIM

PROJECT/CLIENT INFO				LAB				ER INFO			
Facility Name / Job#	Greenhills Operation			Lab Name	ALS C:			ion	Excel	PDF	EDD
Project Manager	Jeremy Enns			* Lab Contact	Lyudmyla Shvets				X	X	X
Email	Jeremy.Enns@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	X	X	X
Address	P.O. BOX 5000			Address	2559 29 Street NE			Email 3:	teckcoal@equisonline.com		X
City	Elkford	Province	BC	City	Calgary	Province	AB	PO number	540380		
Postal Code	V0B1H0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada				
Phone Number	250-865-3341			Phone Number	403 407 1794						

SAMPLE DETAILS								ANALYSIS REQUESTED											Filtered F: Field, L: Lab, FL: Field & Lab, N: None
								FIL	N	N	N		N	N	N				
								PRESERV	NONE	H2SO4	NONE	HCL	NONE	NONE	HNO3				
Sample ID	Sample Location (sys loc code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-ROUTINE-VA	TECKCOAL-MET-T-VA				
GH_POTW15_WG_2018-07-01_NP	GH_POTW15	WG		2018/08/29	2:40	G	7		1	1	1	1	1	1	1				
~~GH_POTW17_WG_2018-07-01_NP~~	~~GH_POTW17~~	WG		2018/08/29		G	7		1	1	1	1	1	1	1				
~~GH_POTW09_WG_2018-07-01_NP~~	~~GH_POTW09~~	WG		2018/08/29		G	7		1	1	1	1	1	1	1				
GH_POTW10_WG_2018-07-01_NP	GH_POTW10	WG		2018/08/29	2:00	G	7		1	1	1	1	1	1	1				
GH_GHLRP3_WG_2018-07-01_NP	GH_GHLRP3	WG		2018/08/29		G	7		1	1	1	1	1	1	1				
GH_GHER3_WG_2018-07-01_NP	GH_GHER3	WG		2018/08/29		G	7		1	1	1	1	1	1	1				
~~GH_POTW06_WG_2018-07-01_NP~~	~~GH_POTW06~~	WG		2018/08/29		G	7		1	1	1	1	1	1	1				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

8/30 9:15

9

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
BOX 5000
ELKFORD BC V0B1H0

Date Received: 31-AUG-18
Report Date: 19-SEP-18 15:08 (MT)
Version: FINAL

Client Phone: 250-865-3305

Certificate of Analysis

Lab Work Order #: L2157146

Project P.O. #: VPO00540380
Job Reference: GREENHILLS OPERATION
C of C Numbers: QTR_GW_2018-07-01_27
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2157146-1 GH_POTW17_WG_2018-07-01_NP							
Sampled By: CLIENT on 30-AUG-18 @ 14:51							
Matrix: WG							
Alkalinity Species by Titration							
Alkalinity Species by Titration							
Alkalinity, Bicarbonate (as CaCO3)	289		1.0	mg/L		10-SEP-18	R4207027
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		10-SEP-18	R4207027
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		10-SEP-18	R4207027
Alkalinity, Total (as CaCO3)	289		1.0	mg/L		10-SEP-18	R4207027
Miscellaneous Parameters							
Acidity (as CaCO3)	6.7		1.0	mg/L		10-SEP-18	R4207191
Chloride (Cl)	17.8		0.50	mg/L		09-SEP-18	R4208431
Conductivity	1210		2.0	uS/cm		10-SEP-18	R4207191
Dissolved Organic Carbon	1.31		0.50	mg/L		11-SEP-18	R4214062
Total Kjeldahl Nitrogen	0.075		0.050	mg/L		09-SEP-18	R4207713
Total Organic Carbon	1.35		0.50	mg/L		13-SEP-18	R4216218
pH	8.00		0.10	pH		10-SEP-18	R4207191
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	04-SEP-18	04-SEP-18	R4200610
Dissolved Metals Filtration Location	LAB					04-SEP-18	R4200108
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	05-SEP-18	05-SEP-18	R4203031
Dissolved Mercury Filtration Location	LAB					05-SEP-18	R4200950
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	LAB					04-SEP-18	R4200108
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	04-SEP-18	04-SEP-18	R4200610
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Arsenic (As)-Dissolved	0.00020		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Barium (Ba)-Dissolved	0.0279		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	04-SEP-18	04-SEP-18	R4200610
Boron (B)-Dissolved	0.022		0.010	mg/L	04-SEP-18	04-SEP-18	R4200610
Cadmium (Cd)-Dissolved	0.0477		0.0050	ug/L	04-SEP-18	04-SEP-18	R4200610
Calcium (Ca)-Dissolved	162		0.050	mg/L	04-SEP-18	04-SEP-18	R4200610
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Cobalt (Co)-Dissolved	0.15		0.10	ug/L	04-SEP-18	04-SEP-18	R4200610
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	04-SEP-18	04-SEP-18	R4200610
Iron (Fe)-Dissolved	0.224		0.010	mg/L	04-SEP-18	04-SEP-18	R4200610
Lead (Pb)-Dissolved	0.000408		0.000050	mg/L	04-SEP-18	04-SEP-18	R4200610
Lithium (Li)-Dissolved	0.0148		0.0010	mg/L	04-SEP-18	04-SEP-18	R4200610
Magnesium (Mg)-Dissolved	67.8		0.10	mg/L	04-SEP-18	04-SEP-18	R4200610
Manganese (Mn)-Dissolved	0.0729		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Molybdenum (Mo)-Dissolved	0.00117		0.000050	mg/L	04-SEP-18	04-SEP-18	R4200610
Nickel (Ni)-Dissolved	0.0136		0.00050	mg/L	04-SEP-18	04-SEP-18	R4200610
Potassium (K)-Dissolved	1.58		0.050	mg/L	04-SEP-18	04-SEP-18	R4200610
Selenium (Se)-Dissolved	9.42		0.050	ug/L	04-SEP-18	04-SEP-18	R4200610
Silicon (Si)-Dissolved	4.30		0.050	mg/L	04-SEP-18	04-SEP-18	R4200610
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	04-SEP-18	04-SEP-18	R4200610
Sodium (Na)-Dissolved	7.84		0.050	mg/L	04-SEP-18	04-SEP-18	R4200610
Strontium (Sr)-Dissolved	0.462		0.00020	mg/L	04-SEP-18	04-SEP-18	R4200610
Thallium (Tl)-Dissolved	0.000011		0.000010	mg/L	04-SEP-18	04-SEP-18	R4200610
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	04-SEP-18	04-SEP-18	R4200610
Uranium (U)-Dissolved	0.00225		0.000010	mg/L	04-SEP-18	04-SEP-18	R4200610
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	04-SEP-18	04-SEP-18	R4200610

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2157146-1 GH_POTW17_WG_2018-07-01_NP							
Sampled By: CLIENT on 30-AUG-18 @ 14:51							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Zinc (Zn)-Dissolved	0.0036		0.0010	mg/L	04-SEP-18	04-SEP-18	R4200610
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	683		0.50	mg/L		05-SEP-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		05-SEP-18	R4203396
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		06-SEP-18	R4203542
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0279		0.0030	mg/L		05-SEP-18	R4203396
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		05-SEP-18	R4203396
Arsenic (As)-Total	0.00092		0.00010	mg/L		05-SEP-18	R4203396
Barium (Ba)-Total	0.0270		0.00010	mg/L		05-SEP-18	R4203396
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		05-SEP-18	R4203396
Boron (B)-Total	0.022		0.010	mg/L		05-SEP-18	R4203396
Cadmium (Cd)-Total	0.0554		0.0050	ug/L		05-SEP-18	R4203396
Calcium (Ca)-Total	168		0.050	mg/L		05-SEP-18	R4203396
Chromium (Cr)-Total	0.00086		0.00010	mg/L		05-SEP-18	R4203396
Cobalt (Co)-Total	0.26		0.10	ug/L		05-SEP-18	R4203396
Copper (Cu)-Total	0.00823		0.00050	mg/L		05-SEP-18	R4203396
Iron (Fe)-Total	0.757		0.010	mg/L		05-SEP-18	R4203396
Lead (Pb)-Total	0.00184		0.000050	mg/L		05-SEP-18	R4203396
Lithium (Li)-Total	0.0135		0.0010	mg/L		05-SEP-18	R4203396
Magnesium (Mg)-Total	72.9		0.10	mg/L		05-SEP-18	R4203396
Manganese (Mn)-Total	0.0887		0.00010	mg/L		05-SEP-18	R4203396
Molybdenum (Mo)-Total	0.00107		0.000050	mg/L		05-SEP-18	R4203396
Nickel (Ni)-Total	0.161		0.00050	mg/L		05-SEP-18	R4203396
Potassium (K)-Total	1.61		0.050	mg/L		05-SEP-18	R4203396
Selenium (Se)-Total	8.57		0.050	ug/L		05-SEP-18	R4203396
Silicon (Si)-Total	4.67		0.10	mg/L		05-SEP-18	R4203396
Silver (Ag)-Total	<0.000010		0.000010	mg/L		05-SEP-18	R4203396
Sodium (Na)-Total	8.13		0.050	mg/L		05-SEP-18	R4203396
Strontium (Sr)-Total	0.458		0.00020	mg/L		05-SEP-18	R4203396
Thallium (Tl)-Total	0.000014		0.000010	mg/L		05-SEP-18	R4203396
Tin (Sn)-Total	<0.00010		0.00010	mg/L		05-SEP-18	R4203396
Titanium (Ti)-Total	<0.010		0.010	mg/L		05-SEP-18	R4203396
Uranium (U)-Total	0.00244		0.000010	mg/L		05-SEP-18	R4203396
Vanadium (V)-Total	<0.00050		0.00050	mg/L		05-SEP-18	R4203396
Zinc (Zn)-Total	0.0169		0.0030	mg/L		05-SEP-18	R4203396
Routine for Teck Coal							
Ammonia, Total (as N)							
Ammonia as N	0.0388		0.0050	mg/L		03-SEP-18	R4198627
Ion Balance Calculation							
Ion Balance	89.1		-100	%		10-SEP-18	
Ion Balance Calculation							
Cation - Anion Balance	-5.8			%		10-SEP-18	
Anion Sum	15.8			meq/L		10-SEP-18	
Cation Sum	14.0			meq/L		10-SEP-18	
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		01-SEP-18	R4196670
Oxidation redution potential by elect.							
ORP	413		-1000	mV		10-SEP-18	R4207627

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2157146-1 GH_POTW17_WG_2018-07-01_NP							
Sampled By: CLIENT on 30-AUG-18 @ 14:51							
Matrix: WG							
Phosphorus (P)-Total							
Phosphorus (P)-Total	0.0055		0.0020	mg/L		17-SEP-18	R4218310
Total Dissolved Solids							
Total Dissolved Solids	980	DLHC	20	mg/L		05-SEP-18	R4203973
Total Suspended Solids							
Total Suspended Solids	3.3		1.0	mg/L		06-SEP-18	R4204964
Turbidity							
Turbidity	2.42		0.10	NTU		02-SEP-18	R4202009
Anions by Ion Chromatography							
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLDS	0.25	mg/L		09-SEP-18	R4208431
Fluoride in Water by IC							
Fluoride (F)	0.17		0.10	mg/L		09-SEP-18	R4208431
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.450		0.025	mg/L		09-SEP-18	R4208431
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0050	DLDS	0.0050	mg/L		09-SEP-18	R4208431
Sulfate in Water by IC							
Sulfate (SO4)	453		1.5	mg/L		09-SEP-18	R4208431
L2157146-2 GH_MW-TD_WG_2018-07-01_NP							
Sampled By: CLIENT on 30-AUG-18 @ 14:08							
Matrix: WG							
Alkalinity Species by Titration							
Alkalinity Species by Titration							
Alkalinity, Bicarbonate (as CaCO3)	349		1.0	mg/L		10-SEP-18	R4207027
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		10-SEP-18	R4207027
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		10-SEP-18	R4207027
Alkalinity, Total (as CaCO3)	349		1.0	mg/L		10-SEP-18	R4207027
Miscellaneous Parameters							
Acidity (as CaCO3)	6.1		1.0	mg/L		10-SEP-18	R4207191
Chloride (Cl)	0.55		0.50	mg/L		09-SEP-18	R4208431
Conductivity	715		2.0	uS/cm		10-SEP-18	R4207191
Dissolved Organic Carbon	1.06		0.50	mg/L		10-SEP-18	R4214098
Hardness (as CaCO3)	334		0.50	mg/L		05-SEP-18	
Total Kjeldahl Nitrogen	0.101		0.050	mg/L		09-SEP-18	R4207713
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		06-SEP-18	R4203542
Total Organic Carbon	1.05		0.50	mg/L		10-SEP-18	R4214098
pH	8.00		0.10	pH		10-SEP-18	R4207191
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	04-SEP-18	04-SEP-18	R4200610
Dissolved Metals Filtration Location	LAB					04-SEP-18	R4200108
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	05-SEP-18	05-SEP-18	R4203031
Dissolved Mercury Filtration Location	LAB					05-SEP-18	R4200950
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	LAB					04-SEP-18	R4200108
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	04-SEP-18	04-SEP-18	R4200610
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Arsenic (As)-Dissolved	0.00013		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Barium (Ba)-Dissolved	0.0215		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	04-SEP-18	04-SEP-18	R4200610

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2157146-2 GH_MW-TD_WG_2018-07-01_NP							
Sampled By: CLIENT on 30-AUG-18 @ 14:08							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Boron (B)-Dissolved	0.302		0.010	mg/L	04-SEP-18	04-SEP-18	R4200610
Cadmium (Cd)-Dissolved	0.339		0.0050	ug/L	04-SEP-18	04-SEP-18	R4200610
Calcium (Ca)-Dissolved	79.8		0.050	mg/L	04-SEP-18	04-SEP-18	R4200610
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Cobalt (Co)-Dissolved	0.40		0.10	ug/L	04-SEP-18	04-SEP-18	R4200610
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	04-SEP-18	04-SEP-18	R4200610
Iron (Fe)-Dissolved	1.04		0.010	mg/L	04-SEP-18	04-SEP-18	R4200610
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	04-SEP-18	04-SEP-18	R4200610
Lithium (Li)-Dissolved	0.0397		0.0010	mg/L	04-SEP-18	04-SEP-18	R4200610
Magnesium (Mg)-Dissolved	32.7		0.10	mg/L	04-SEP-18	04-SEP-18	R4200610
Manganese (Mn)-Dissolved	0.669		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Molybdenum (Mo)-Dissolved	0.00273		0.000050	mg/L	04-SEP-18	04-SEP-18	R4200610
Nickel (Ni)-Dissolved	0.00079		0.00050	mg/L	04-SEP-18	04-SEP-18	R4200610
Potassium (K)-Dissolved	2.32		0.050	mg/L	04-SEP-18	04-SEP-18	R4200610
Selenium (Se)-Dissolved	0.118		0.050	ug/L	04-SEP-18	04-SEP-18	R4200610
Silicon (Si)-Dissolved	5.95		0.050	mg/L	04-SEP-18	04-SEP-18	R4200610
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	04-SEP-18	04-SEP-18	R4200610
Sodium (Na)-Dissolved	26.6		0.050	mg/L	04-SEP-18	04-SEP-18	R4200610
Strontium (Sr)-Dissolved	1.10		0.00020	mg/L	04-SEP-18	04-SEP-18	R4200610
Thallium (Tl)-Dissolved	0.000136		0.000010	mg/L	04-SEP-18	04-SEP-18	R4200610
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	04-SEP-18	04-SEP-18	R4200610
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	04-SEP-18	04-SEP-18	R4200610
Uranium (U)-Dissolved	0.000948		0.000010	mg/L	04-SEP-18	04-SEP-18	R4200610
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	04-SEP-18	04-SEP-18	R4200610
Zinc (Zn)-Dissolved	0.0012		0.0010	mg/L	04-SEP-18	04-SEP-18	R4200610
Routine for Teck Coal							
Ammonia, Total (as N)							
Ammonia as N	0.105		0.0050	mg/L		03-SEP-18	R4198627
Ion Balance Calculation							
Ion Balance	90.2		-100	%		10-SEP-18	
Ion Balance Calculation							
Cation - Anion Balance	-5.2			%		10-SEP-18	
Anion Sum	8.84			meq/L		10-SEP-18	
Cation Sum	7.97			meq/L		10-SEP-18	
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		01-SEP-18	R4196670
Oxidation redution potential by elect.							
ORP	238		-1000	mV		10-SEP-18	R4207627
Phosphorus (P)-Total							
Phosphorus (P)-Total	<0.0020		0.0020	mg/L		17-SEP-18	R4218310
Total Dissolved Solids							
Total Dissolved Solids	458	DLHC	20	mg/L		05-SEP-18	R4203973
Total Suspended Solids							
Total Suspended Solids	2.9		1.0	mg/L		06-SEP-18	R4204964
Turbidity							
Turbidity	9.10		0.10	NTU		02-SEP-18	R4202009
Anions by Ion Chromatography							
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLDS	0.25	mg/L		09-SEP-18	R4208431
Fluoride in Water by IC							
Fluoride (F)	0.29		0.10	mg/L		09-SEP-18	R4208431
Nitrate in Water by IC (Low Level)							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2157146-2 GH_MW-TD_WG_2018-07-01_NP							
Sampled By: CLIENT on 30-AUG-18 @ 14:08							
Matrix: WG							
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	<0.025	DLDS	0.025	mg/L		09-SEP-18	R4208431
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0050	DLDS	0.0050	mg/L		09-SEP-18	R4208431
Sulfate in Water by IC							
Sulfate (SO4)	87.9		1.5	mg/L		09-SEP-18	R4208431

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	LAB FILTER PRESERVE DIS METALS, DOC - Sample was Filtered and Preserved at the laboratory

Sample Parameter Qualifier Key:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E
Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.			
Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:			
Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]			
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498
This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.			
It is recommended that this analysis be conducted in the field.			
P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
It is recommended that this analysis be conducted in the field.			
PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

QTR_GW_2018-07-01_27

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TECK COAL LIMITED (GREENHILLS)
BOX 5000
ELKFORD BC V0B1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4207191								
WG2871526-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			106.0		%		85-115	10-SEP-18
WG2871526-1 MB								
Acidity (as CaCO3)			1.8		mg/L		2	10-SEP-18
ALK-TITR-VA	**Water**							
Batch R4207027								
WG2871512-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			101.5		%		85-115	10-SEP-18
WG2871512-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	10-SEP-18
BE-D-L-CCMS-VA	**Water**							
Batch R4200610								
WG2867559-3 DUP		**L2157146-1**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	04-SEP-18
WG2867559-2 LCS								
Beryllium (Be)-Dissolved			93.6		%		80-120	04-SEP-18
WG2867559-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	04-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4203396								
WG2867549-2 LCS								
Beryllium (Be)-Total			93.1		%		80-120	05-SEP-18
WG2867549-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	05-SEP-18
BR-L-IC-N-VA	**Water**							
Batch R4208431								
WG2871481-2 LCS								
Bromide (Br)			102.4		%		85-115	09-SEP-18
WG2871481-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	09-SEP-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4214062								
WG2874366-10 LCS								
Dissolved Organic Carbon			101.2		%		80-120	11-SEP-18
WG2874366-9 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	11-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R4214098								
WG2874413-6 LCS								
Dissolved Organic Carbon			87.8		%		80-120	10-SEP-18
WG2874413-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	10-SEP-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4214098								
WG2874413-6 LCS								
Total Organic Carbon			104.2		%		80-120	10-SEP-18
WG2874413-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	10-SEP-18
Batch R4216218								
WG2876863-2 LCS								
Total Organic Carbon			99.5		%		80-120	13-SEP-18
WG2876863-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-SEP-18
CL-L-IC-N-VA	**Water**							
Batch R4208431								
WG2871481-2 LCS								
Chloride (Cl)			99.6		%		90-110	09-SEP-18
WG2871481-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	09-SEP-18
EC-PCT-VA	**Water**							
Batch R4207027								
WG2871512-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			102.5		%		90-110	10-SEP-18
WG2871512-1 MB								
Conductivity			<2.0		uS/cm		2	10-SEP-18
F-IC-N-VA	**Water**							
Batch R4208431								
WG2871481-2 LCS								
Fluoride (F)			100.8		%		90-110	09-SEP-18
WG2871481-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	09-SEP-18
HG-D-CVAA-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R4203031								
WG2867845-3 DUP		**L2157146-2**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	05-SEP-18
WG2867845-2 LCS								
Mercury (Hg)-Dissolved			100.1		%		80-120	05-SEP-18
WG2867845-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	05-SEP-18
WG2867845-4 MS		**L2157146-1**						
Mercury (Hg)-Dissolved			87.2		%		70-130	05-SEP-18
HG-T-CVAA-VA	**Water**							
Batch R4203542								
WG2869027-2 LCS								
Mercury (Hg)-Total			100.6		%		80-120	06-SEP-18
WG2869027-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	06-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4200610								
WG2867559-3 DUP		**L2157146-1**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	04-SEP-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-SEP-18
Arsenic (As)-Dissolved		0.00020	0.00019		mg/L	6.8	20	04-SEP-18
Barium (Ba)-Dissolved		0.0279	0.0267		mg/L	4.3	20	04-SEP-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-SEP-18
Boron (B)-Dissolved		0.022	0.021		mg/L	3.0	20	04-SEP-18
Cadmium (Cd)-Dissolved		0.0000477	0.0000478		mg/L	0.3	20	04-SEP-18
Calcium (Ca)-Dissolved		162	164		mg/L	1.4	20	04-SEP-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-SEP-18
Cobalt (Co)-Dissolved		0.00015	0.00015		mg/L	5.0	20	04-SEP-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-SEP-18
Iron (Fe)-Dissolved		0.224	0.223		mg/L	0.4	20	04-SEP-18
Lead (Pb)-Dissolved		0.000408	0.000401		mg/L	1.8	20	04-SEP-18
Lithium (Li)-Dissolved		0.0148	0.0143		mg/L	3.4	20	04-SEP-18
Magnesium (Mg)-Dissolved		67.8	67.2		mg/L	0.9	20	04-SEP-18
Manganese (Mn)-Dissolved		0.0729	0.0723		mg/L	0.8	20	04-SEP-18
Molybdenum (Mo)-Dissolved		0.00117	0.00106		mg/L	10	20	04-SEP-18
Nickel (Ni)-Dissolved		0.0136	0.0138		mg/L	1.7	20	04-SEP-18
Potassium (K)-Dissolved		1.58	1.58		mg/L	0.4	20	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200610								
WG2867559-3 DUP		**L2157146-1**						
Selenium (Se)-Dissolved		0.00942	0.00905		mg/L	4.0	20	04-SEP-18
Silicon (Si)-Dissolved		4.30	4.30		mg/L	0.2	20	04-SEP-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-SEP-18
Sodium (Na)-Dissolved		7.84	7.72		mg/L	1.6	20	04-SEP-18
Strontium (Sr)-Dissolved		0.462	0.460		mg/L	0.3	20	04-SEP-18
Thallium (Tl)-Dissolved		0.000011	0.000012		mg/L	3.3	20	04-SEP-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-SEP-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-SEP-18
Uranium (U)-Dissolved		0.00225	0.00219		mg/L	3.0	20	04-SEP-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-SEP-18
Zinc (Zn)-Dissolved		0.0036	0.0036		mg/L	0.6	20	04-SEP-18
WG2867559-2 LCS								
Aluminum (Al)-Dissolved			95.6		%		80-120	04-SEP-18
Antimony (Sb)-Dissolved			97.3		%		80-120	04-SEP-18
Arsenic (As)-Dissolved			101.5		%		80-120	04-SEP-18
Barium (Ba)-Dissolved			92.0		%		80-120	04-SEP-18
Bismuth (Bi)-Dissolved			85.1		%		80-120	04-SEP-18
Boron (B)-Dissolved			93.4		%		80-120	04-SEP-18
Cadmium (Cd)-Dissolved			97.0		%		80-120	04-SEP-18
Calcium (Ca)-Dissolved			91.7		%		80-120	04-SEP-18
Chromium (Cr)-Dissolved			94.9		%		80-120	04-SEP-18
Cobalt (Co)-Dissolved			95.4		%		80-120	04-SEP-18
Copper (Cu)-Dissolved			94.9		%		80-120	04-SEP-18
Iron (Fe)-Dissolved			92.4		%		80-120	04-SEP-18
Lead (Pb)-Dissolved			91.2		%		80-120	04-SEP-18
Lithium (Li)-Dissolved			94.7		%		80-120	04-SEP-18
Magnesium (Mg)-Dissolved			95.0		%		80-120	04-SEP-18
Manganese (Mn)-Dissolved			96.6		%		80-120	04-SEP-18
Molybdenum (Mo)-Dissolved			98.4		%		80-120	04-SEP-18
Nickel (Ni)-Dissolved			95.8		%		80-120	04-SEP-18
Potassium (K)-Dissolved			98.8		%		80-120	04-SEP-18
Selenium (Se)-Dissolved			103.1		%		80-120	04-SEP-18
Silicon (Si)-Dissolved			99.8		%		60-140	04-SEP-18
Silver (Ag)-Dissolved			90.3		%		80-120	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200610								
WG2867559-2 LCS								
Sodium (Na)-Dissolved			93.8		%		80-120	04-SEP-18
Strontium (Sr)-Dissolved			92.7		%		80-120	04-SEP-18
Thallium (Tl)-Dissolved			89.3		%		80-120	04-SEP-18
Tin (Sn)-Dissolved			98.0		%		80-120	04-SEP-18
Titanium (Ti)-Dissolved			94.7		%		80-120	04-SEP-18
Uranium (U)-Dissolved			90.4		%		80-120	04-SEP-18
Vanadium (V)-Dissolved			97.8		%		80-120	04-SEP-18
Zinc (Zn)-Dissolved			95.0		%		80-120	04-SEP-18
WG2867559-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	04-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	04-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	04-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	04-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200610								
WG2867559-1 MB		**LF**						
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	04-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4203396								
WG2867549-2 LCS								
Aluminum (Al)-Total			94.5		%		80-120	05-SEP-18
Antimony (Sb)-Total			93.9		%		80-120	05-SEP-18
Arsenic (As)-Total			96.8		%		80-120	05-SEP-18
Barium (Ba)-Total			91.6		%		80-120	05-SEP-18
Bismuth (Bi)-Total			88.1		%		80-120	05-SEP-18
Boron (B)-Total			90.4		%		80-120	05-SEP-18
Cadmium (Cd)-Total			93.2		%		80-120	05-SEP-18
Calcium (Ca)-Total			90.0		%		80-120	05-SEP-18
Chromium (Cr)-Total			94.0		%		80-120	05-SEP-18
Cobalt (Co)-Total			92.0		%		80-120	05-SEP-18
Copper (Cu)-Total			89.2		%		80-120	05-SEP-18
Iron (Fe)-Total			94.0		%		80-120	05-SEP-18
Lead (Pb)-Total			89.8		%		80-120	05-SEP-18
Lithium (Li)-Total			91.8		%		80-120	05-SEP-18
Magnesium (Mg)-Total			93.5		%		80-120	05-SEP-18
Manganese (Mn)-Total			93.7		%		80-120	05-SEP-18
Molybdenum (Mo)-Total			93.4		%		80-120	05-SEP-18
Nickel (Ni)-Total			90.1		%		80-120	05-SEP-18
Potassium (K)-Total			91.9		%		80-120	05-SEP-18
Selenium (Se)-Total			94.6		%		80-120	05-SEP-18
Silicon (Si)-Total			101.7		%		80-120	05-SEP-18
Silver (Ag)-Total			89.4		%		80-120	05-SEP-18
Sodium (Na)-Total			93.5		%		80-120	05-SEP-18
Strontium (Sr)-Total			96.1		%		80-120	05-SEP-18
Thallium (Tl)-Total			89.9		%		80-120	05-SEP-18
Tin (Sn)-Total			97.4		%		80-120	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4203396								
WG2867549-2 LCS								
Titanium (Ti)-Total			94.5		%		80-120	05-SEP-18
Uranium (U)-Total			94.7		%		80-120	05-SEP-18
Vanadium (V)-Total			91.4		%		80-120	05-SEP-18
Zinc (Zn)-Total			86.2		%		80-120	05-SEP-18
WG2867549-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	05-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	05-SEP-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	05-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	05-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	05-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	05-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	05-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	05-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	05-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	05-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	05-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	05-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4203418								
WG2867549-1 MB								
Arsenic (As)-Total			<0.00010		mg/L		0.0001	05-SEP-18
NH3-L-F-CL	**Water**							
Batch R4198627								
WG2867232-14 LCS								
Ammonia as N			99.5		%		85-115	03-SEP-18
WG2867232-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	03-SEP-18
NO2-L-IC-N-VA	**Water**							
Batch R4208431								
WG2871481-2 LCS								
Nitrite (as N)			100.7		%		90-110	09-SEP-18
WG2871481-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	09-SEP-18
NO3-L-IC-N-VA	**Water**							
Batch R4208431								
WG2871481-2 LCS								
Nitrate (as N)			100.6		%		90-110	09-SEP-18
WG2871481-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	09-SEP-18
ORP-CL	**Water**							
Batch R4207627								
WG2872339-7 CRM		**CL-ORP**						
ORP			224		mV		210-230	10-SEP-18
P-T-L-COL-CL	**Water**							
Batch R4218310								
WG2879315-3 DUP		**L2157146-1**						
Phosphorus (P)-Total		0.0055	0.0057		mg/L	1.9	20	17-SEP-18
WG2879315-2 LCS								
Phosphorus (P)-Total			95.8		%		80-120	17-SEP-18
WG2879315-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	17-SEP-18
WG2879315-4 MS		**L2157146-1**						
Phosphorus (P)-Total			88.2		%		70-130	17-SEP-18
PH-PCT-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-PCT-VA	**Water**							
Batch R4207027								
WG2871512-2 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	10-SEP-18
PO4-DO-L-COL-CL	**Water**							
Batch R4196670								
WG2866156-23 DUP		**L2157146-1**						
Orthophosphate-Dissolved (as P)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	01-SEP-18
WG2866156-22 LCS								
Orthophosphate-Dissolved (as P)			96.6		%		80-120	01-SEP-18
WG2866156-21 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	01-SEP-18
WG2866156-24 MS		**L2157146-1**						
Orthophosphate-Dissolved (as P)			105.3		%		70-130	01-SEP-18
SO4-IC-N-VA	**Water**							
Batch R4208431								
WG2871481-2 LCS								
Sulfate (SO4)			100.7		%		90-110	09-SEP-18
WG2871481-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	09-SEP-18
SOLIDS-TDS-CL	**Water**							
Batch R4203973								
WG2868271-9 LCS								
Total Dissolved Solids			96.1		%		85-115	05-SEP-18
WG2868271-7 MB								
Total Dissolved Solids			<10		mg/L		10	05-SEP-18
TKN-L-F-CL	**Water**							
Batch R4207713								
WG2870103-11 LCS								
Total Kjeldahl Nitrogen			101.9		%		75-125	09-SEP-18
WG2870103-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	09-SEP-18
TSS-L-CL	**Water**							
Batch R4204964								
WG2869855-2 LCS								
Total Suspended Solids			97.6		%		85-115	06-SEP-18
WG2869855-1 MB								
Total Suspended Solids			<1.0		mg/L		1	06-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-CL	**Water**							
Batch R4202009								
WG2866714-2 LCS								
Turbidity			97.5		%		85-115	02-SEP-18
WG2866714-1 MB								
Turbidity			<0.10		NTU		0.1	02-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	30-AUG-18 14:51	10-SEP-18 00:00	0.25	249	hours	EHTR-FM
	2	30-AUG-18 14:08	10-SEP-18 00:00	0.25	250	hours	EHTR-FM
pH by Meter (Automated)							
	1	30-AUG-18 14:51	10-SEP-18 10:17	0.25	259	hours	EHTR-FM
	2	30-AUG-18 14:08	10-SEP-18 10:17	0.25	260	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	30-AUG-18 14:51	09-SEP-18 08:19	3	10	days	EHT
	2	30-AUG-18 14:08	09-SEP-18 08:19	3	10	days	EHT
Nitrite in Water by IC (Low Level)							
	1	30-AUG-18 14:51	09-SEP-18 08:19	3	10	days	EHT
	2	30-AUG-18 14:08	09-SEP-18 08:19	3	10	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2157146 were received on 31-AUG-18 10:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

Page 3

COC ID:	QTR_GW_2018-07-01_27	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Greenhills Operation			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jeremy Enns			Lab Contact	Lyudmyla Shvets			Email 1:	Jeremy.Enns@teck.com	X	X	X
Email	Jeremy.Enns@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	Leigh.Stickney@teck.com	X	X	X
Address	P.O. BOX 5000			Address	2559 29 Street NE			Email 3:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B1H0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada					
Phone Number	250-865-3341			Phone Number	403 407 1794							

SAMPLE DETAILS — ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

L2157146-COFC

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-ROUTINE-VA	TECKCOAL-MET-T-VA
FIELD FILTERED								N	N	N		N	N	N
PRESERVATIVE								NONE	H2SO4	NONE	HCL	NONE	NONE	HNO3
[redacted]														
GH_POTW17_WG_2018-07-01_NP	GH_POTW17	WG		8/30/2018	14:51	G	7	1	1	1	1	1	1	1
[redacted]														
[redacted]														
GH_MW-TD_WG_2018-07-01_NP	GH_MW-TD	WG		8/30/2018	14:08	G	6	1	1	1	1	1	1	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
				8/31 10:10

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

12°C

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
BOX 5000
ELKFORD BC V0B1H0

Date Received: 13-SEP-18
Report Date: 26-SEP-18 15:15 (MT)
Version: FINAL

Client Phone: 250-865-3305

Certificate of Analysis

Lab Work Order #: L2163892

Project P.O. #: VPO00540380
Job Reference: GREENHILLS OPERATION
C of C Numbers: QTR_GW_2018-09-03
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-1 GH_GA-MW-2_WG_2018-07-01_NP							
Sampled By: CLIENT on 12-SEP-18 @ 10:45							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	<0.50		0.50	mg/L		20-SEP-18	R4230683
Phosphorus (P)-Total	0.0053		0.0020	mg/L		24-SEP-18	R4236892
Total Kjeldahl Nitrogen	0.298	TKNI	0.050	mg/L		17-SEP-18	R4217558
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		18-SEP-18	R4218256
Total Organic Carbon	<0.50		0.50	mg/L		21-SEP-18	R4233388
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	14-SEP-18	15-SEP-18	R4216828
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	15-SEP-18	18-SEP-18	R4218256
Dissolved Mercury Filtration Location	FIELD					15-SEP-18	R4216732
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	14-SEP-18	15-SEP-18	R4216828
Antimony (Sb)-Dissolved	0.00207		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Arsenic (As)-Dissolved	0.00025		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Barium (Ba)-Dissolved	0.0549		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Boron (B)-Dissolved	0.018		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cadmium (Cd)-Dissolved	<0.060	DLM	0.060	ug/L	14-SEP-18	15-SEP-18	R4216828
Calcium (Ca)-Dissolved	123		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cobalt (Co)-Dissolved	0.34		0.10	ug/L	14-SEP-18	15-SEP-18	R4216828
Copper (Cu)-Dissolved	0.00561		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Lithium (Li)-Dissolved	0.0162		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Magnesium (Mg)-Dissolved	36.9		0.10	mg/L	14-SEP-18	15-SEP-18	R4216828
Manganese (Mn)-Dissolved	0.0703		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Molybdenum (Mo)-Dissolved	0.0633		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Nickel (Ni)-Dissolved	0.00522		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Potassium (K)-Dissolved	1.14		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Selenium (Se)-Dissolved	13.5		0.050	ug/L	14-SEP-18	15-SEP-18	R4216828
Silicon (Si)-Dissolved	3.38		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Sodium (Na)-Dissolved	9.15		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Strontium (Sr)-Dissolved	0.531		0.00020	mg/L	14-SEP-18	15-SEP-18	R4216828
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Uranium (U)-Dissolved	0.00580		0.000010	mg/L	14-SEP-18	16-SEP-18	R4217614
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Zinc (Zn)-Dissolved	0.0071		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Hardness							
Hardness (as CaCO3)	458		0.50	mg/L		17-SEP-18	
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<1.0		1.0	mg/L		19-SEP-18	R4227995
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	219		1.0	mg/L		13-SEP-18	R4216390

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-1 GH_GA-MW-2_WG_2018-07-01_NP							
Sampled By: CLIENT on 12-SEP-18 @ 10:45							
Matrix: WG							
Alkalinity (Species) by Manual Titration							
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		13-SEP-18	R4216390
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		13-SEP-18	R4216390
Alkalinity, Total (as CaCO3)	219		1.0	mg/L		13-SEP-18	R4216390
Ammonia, Total (as N)							
Ammonia as N	<0.0050		0.0050	mg/L		14-SEP-18	R4216503
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLHC	0.25	mg/L		13-SEP-18	R4216076
Chloride in Water by IC							
Chloride (Cl)	7.5	DLHC	2.5	mg/L		13-SEP-18	R4216076
Electrical Conductivity (EC)							
Conductivity (@ 25C)	879		2.0	uS/cm		13-SEP-18	R4216390
Fluoride in Water by IC							
Fluoride (F)	0.13	DLHC	0.10	mg/L		13-SEP-18	R4216076
Ion Balance Calculation							
Ion Balance	89.7		-100	%		20-SEP-18	
Ion Balance Calculation							
Cation - Anion Balance	-5.4			%		20-SEP-18	
Anion Sum	10.7			meq/L		20-SEP-18	
Cation Sum	9.58			meq/L		20-SEP-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	5.68	DLHC	0.025	mg/L		13-SEP-18	R4216076
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.136	DLHC	0.0050	mg/L		13-SEP-18	R4216076
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		13-SEP-18	R4216282
Oxidation redution potential by elect.							
ORP	403		-1000	mV		17-SEP-18	R4218827
Sulfate in Water by IC							
Sulfate (SO4)	273	DLHC	1.5	mg/L		13-SEP-18	R4216076
Total Dissolved Solids							
Total Dissolved Solids	655	DLHC	20	mg/L		18-SEP-18	R4226709
Total Suspended Solids							
Total Suspended Solids	2.4		1.0	mg/L		18-SEP-18	R4223790
Turbidity							
Turbidity	0.73		0.10	NTU		14-SEP-18	R4217079
pH							
pH	7.96		0.10	pH		13-SEP-18	R4216390
L2163892-2 GH_GA-MW-3_WG_2018-07-01_NP							
Sampled By: CLIENT on 12-SEP-18 @ 00:55							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	1.15		0.50	mg/L		20-SEP-18	R4230683
Phosphorus (P)-Total	0.0342		0.0020	mg/L		24-SEP-18	R4236892
Total Kjeldahl Nitrogen	0.484		0.050	mg/L		17-SEP-18	R4217558
Mercury (Hg)-Total	<0.00010	DLM	0.00010	mg/L		18-SEP-18	R4218256
Total Organic Carbon	1.63		0.50	mg/L		20-SEP-18	R4230683
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	14-SEP-18	15-SEP-18	R4216828
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681
Diss. Mercury in Water by CVAAS or CVAFS							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-2 GH_GA-MW-3_WG_2018-07-01_NP							
Sampled By: CLIENT on 12-SEP-18 @ 00:55							
Matrix: WG							
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.00010	DLM	0.00010	mg/L	15-SEP-18	18-SEP-18	R4218256
Dissolved Mercury Filtration Location	FIELD					15-SEP-18	R4216732
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681
Aluminum (Al)-Dissolved	0.0036		0.0030	mg/L	14-SEP-18	15-SEP-18	R4216828
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Barium (Ba)-Dissolved	0.0858		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Boron (B)-Dissolved	0.221		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cadmium (Cd)-Dissolved	<0.0050		0.0050	ug/L	14-SEP-18	15-SEP-18	R4216828
Calcium (Ca)-Dissolved	44.0		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Chromium (Cr)-Dissolved	0.00012		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	14-SEP-18	15-SEP-18	R4216828
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Lithium (Li)-Dissolved	0.0905		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Magnesium (Mg)-Dissolved	32.4		0.10	mg/L	14-SEP-18	15-SEP-18	R4216828
Manganese (Mn)-Dissolved	0.00977		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Molybdenum (Mo)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Potassium (K)-Dissolved	2.37		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Selenium (Se)-Dissolved	3.38		0.050	ug/L	14-SEP-18	15-SEP-18	R4216828
Silicon (Si)-Dissolved	4.51		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Sodium (Na)-Dissolved	35.5		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Strontium (Sr)-Dissolved	2.05		0.00020	mg/L	14-SEP-18	15-SEP-18	R4216828
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Uranium (U)-Dissolved	0.000068		0.000010	mg/L	14-SEP-18	16-SEP-18	R4217614
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Hardness							
Hardness (as CaCO3)	243		0.50	mg/L		17-SEP-18	
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<1.0		1.0	mg/L		19-SEP-18	R4227995
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	281		1.0	mg/L		13-SEP-18	R4216390
Alkalinity, Carbonate (as CaCO3)	5.4		1.0	mg/L		13-SEP-18	R4216390
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		13-SEP-18	R4216390
Alkalinity, Total (as CaCO3)	287		1.0	mg/L		13-SEP-18	R4216390
Ammonia, Total (as N)							
Ammonia as N	0.371		0.0050	mg/L		14-SEP-18	R4216503
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		13-SEP-18	R4216076
Chloride in Water by IC							
Chloride (Cl)	6.11		0.50	mg/L		13-SEP-18	R4216076
Electrical Conductivity (EC)							
Conductivity (@ 25C)	588		2.0	uS/cm		13-SEP-18	R4216390

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-2 GH_GA-MW-3_WG_2018-07-01_NP							
Sampled By: CLIENT on 12-SEP-18 @ 00:55							
Matrix: WG							
Fluoride in Water by IC							
Fluoride (F)	0.694		0.020	mg/L		13-SEP-18	R4216076
Ion Balance Calculation							
Cation - Anion Balance	-3.0			%		20-SEP-18	
Anion Sum	6.89			meq/L		20-SEP-18	
Cation Sum	6.49			meq/L		20-SEP-18	
Ion Balance Calculation							
Ion Balance	94.2		-100	%		20-SEP-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.0087		0.0050	mg/L		13-SEP-18	R4216076
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.0011		0.0010	mg/L		13-SEP-18	R4216076
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	0.0293		0.0010	mg/L		13-SEP-18	R4216282
Oxidation redution potential by elect.							
ORP	434		-1000	mV		17-SEP-18	R4218827
Sulfate in Water by IC							
Sulfate (SO4)	45.8		0.30	mg/L		13-SEP-18	R4216076
Total Dissolved Solids							
Total Dissolved Solids	378	DLHC	20	mg/L		18-SEP-18	R4226709
Total Suspended Solids							
Total Suspended Solids	12.6		1.0	mg/L		18-SEP-18	R4223790
Turbidity							
Turbidity	52.2		0.10	NTU		14-SEP-18	R4217079
pH							
pH	8.42		0.10	pH		13-SEP-18	R4216390
L2163892-3 GH_MW-ERSC-1_WG_2018-07-01_NP							
Sampled By: CLIENT on 12-SEP-18 @ 14:20							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	2.41		0.50	mg/L		20-SEP-18	R4230683
Phosphorus (P)-Total	0.0081		0.0020	mg/L		24-SEP-18	R4236892
Total Kjeldahl Nitrogen	0.062		0.050	mg/L		17-SEP-18	R4217558
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		18-SEP-18	R4218256
Total Organic Carbon	2.36		0.50	mg/L		21-SEP-18	R4233388
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	14-SEP-18	15-SEP-18	R4216828
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	15-SEP-18	18-SEP-18	R4218256
Dissolved Mercury Filtration Location	FIELD					15-SEP-18	R4216732
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	14-SEP-18	15-SEP-18	R4216828
Antimony (Sb)-Dissolved	0.00011		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Arsenic (As)-Dissolved	0.00024		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Barium (Ba)-Dissolved	0.142		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Boron (B)-Dissolved	0.014		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cadmium (Cd)-Dissolved	0.0459		0.0050	ug/L	14-SEP-18	15-SEP-18	R4216828
Calcium (Ca)-Dissolved	89.5		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-3 GH_MW-ERSC-1_WG_2018-07-01_NP							
Sampled By: CLIENT on 12-SEP-18 @ 14:20							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Chromium (Cr)-Dissolved	0.00020		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	14-SEP-18	15-SEP-18	R4216828
Copper (Cu)-Dissolved	0.00308		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Lithium (Li)-Dissolved	0.0076		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Magnesium (Mg)-Dissolved	25.8		0.10	mg/L	14-SEP-18	15-SEP-18	R4216828
Manganese (Mn)-Dissolved	0.00695		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Molybdenum (Mo)-Dissolved	0.00332		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Nickel (Ni)-Dissolved	0.00107		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Potassium (K)-Dissolved	0.873		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Selenium (Se)-Dissolved	1.09		0.050	ug/L	14-SEP-18	15-SEP-18	R4216828
Silicon (Si)-Dissolved	5.39		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Sodium (Na)-Dissolved	3.75		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Strontium (Sr)-Dissolved	0.246		0.00020	mg/L	14-SEP-18	15-SEP-18	R4216828
Thallium (Tl)-Dissolved	0.000033		0.000010	mg/L	14-SEP-18	16-SEP-18	R4217614
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Uranium (U)-Dissolved	0.000848		0.000010	mg/L	14-SEP-18	16-SEP-18	R4217614
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Zinc (Zn)-Dissolved	0.0019		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Hardness							
Hardness (as CaCO3)	330		0.50	mg/L		17-SEP-18	
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<1.0		1.0	mg/L		19-SEP-18	R4227995
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	328		1.0	mg/L		13-SEP-18	R4216390
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		13-SEP-18	R4216390
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		13-SEP-18	R4216390
Alkalinity, Total (as CaCO3)	328		1.0	mg/L		13-SEP-18	R4216390
Ammonia, Total (as N)							
Ammonia as N	0.0118		0.0050	mg/L		14-SEP-18	R4216503
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		13-SEP-18	R4216076
Chloride in Water by IC							
Chloride (Cl)	1.14		0.50	mg/L		13-SEP-18	R4216076
Electrical Conductivity (EC)							
Conductivity (@ 25C)	598		2.0	uS/cm		13-SEP-18	R4216390
Fluoride in Water by IC							
Fluoride (F)	0.175		0.020	mg/L		13-SEP-18	R4216076
Ion Balance Calculation							
Ion Balance	97.2		-100	%		20-SEP-18	
Ion Balance Calculation							
Cation - Anion Balance	-1.4			%		20-SEP-18	
Anion Sum	6.97			meq/L		20-SEP-18	
Cation Sum	6.78			meq/L		20-SEP-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.0609		0.0050	mg/L		13-SEP-18	R4216076
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0010		0.0010	mg/L		13-SEP-18	R4216076

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-3 GH_MW-ERSC-1_WG_2018-07-01_NP							
Sampled By: CLIENT on 12-SEP-18 @ 14:20							
Matrix: WG							
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	0.0023		0.0010	mg/L		13-SEP-18	R4216282
Oxidation redution potential by elect.							
ORP	404		-1000	mV		17-SEP-18	R4218827
Sulfate in Water by IC							
Sulfate (SO4)	17.7		0.30	mg/L		13-SEP-18	R4216076
Total Dissolved Solids							
Total Dissolved Solids	371	DLHC	20	mg/L		18-SEP-18	R4226709
Total Suspended Solids							
Total Suspended Solids	1.4		1.0	mg/L		18-SEP-18	R4223790
Turbidity							
Turbidity	0.45		0.10	NTU		14-SEP-18	R4217079
pH							
pH	8.09		0.10	pH		13-SEP-18	R4216390
L2163892-4 GH_WC1_WS_2018-09-12_N							
Sampled By: CLIENT on 12-SEP-18 @ 09:40							
Matrix: WS							
Miscellaneous Parameters							
Dissolved Organic Carbon	1.15		0.50	mg/L		14-SEP-18	R4216218
Total Kjeldahl Nitrogen	<0.050	TKNI	0.050	mg/L		14-SEP-18	R4216680
Mercury (Hg)-Total	<0.00050		0.00050	ug/L		15-SEP-18	R4216914
Total Organic Carbon	2.19		0.50	mg/L		14-SEP-18	R4216218
Phosphorus (P)-Total	0.0040	RRV	0.0010	mg/L		17-SEP-18	R4217754
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	14-SEP-18	14-SEP-18	R4216533
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216368
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	14-SEP-18	14-SEP-18	R4215871
Dissolved Mercury Filtration Location	LAB					14-SEP-18	R4216334
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216368
Aluminum (Al)-Dissolved	0.0247		0.0030	mg/L	14-SEP-18	14-SEP-18	R4216533
Antimony (Sb)-Dissolved	0.00367		0.00010	mg/L	14-SEP-18	14-SEP-18	R4216533
Arsenic (As)-Dissolved	0.00021		0.00010	mg/L	14-SEP-18	14-SEP-18	R4216533
Barium (Ba)-Dissolved	0.0437		0.00010	mg/L	14-SEP-18	14-SEP-18	R4216533
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	14-SEP-18	R4216533
Boron (B)-Dissolved	0.022		0.010	mg/L	14-SEP-18	14-SEP-18	R4216533
Cadmium (Cd)-Dissolved	0.0052		0.0050	ug/L	14-SEP-18	14-SEP-18	R4216533
Calcium (Ca)-Dissolved	217		0.050	mg/L	14-SEP-18	14-SEP-18	R4216533
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	14-SEP-18	R4216533
Cobalt (Co)-Dissolved	1.03		0.10	ug/L	14-SEP-18	14-SEP-18	R4216533
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	14-SEP-18	R4216533
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	14-SEP-18	R4216533
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	14-SEP-18	R4216533
Lithium (Li)-Dissolved	0.185		0.0010	mg/L	14-SEP-18	14-SEP-18	R4216533
Magnesium (Mg)-Dissolved	164		0.10	mg/L	14-SEP-18	14-SEP-18	R4216533
Manganese (Mn)-Dissolved	0.00289		0.00010	mg/L	14-SEP-18	14-SEP-18	R4216533
Molybdenum (Mo)-Dissolved	0.0169		0.000050	mg/L	14-SEP-18	14-SEP-18	R4216533
Nickel (Ni)-Dissolved	0.117		0.00050	mg/L	14-SEP-18	14-SEP-18	R4216533
Potassium (K)-Dissolved	6.71		0.050	mg/L	14-SEP-18	14-SEP-18	R4216533
Selenium (Se)-Dissolved	119		0.050	ug/L	14-SEP-18	14-SEP-18	R4216533

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-4 GH_WC1_WS_2018-09-12_N							
Sampled By: CLIENT on 12-SEP-18 @ 09:40							
Matrix: WS							
Dissolved Metals in Water by CRC ICPMS							
Silicon (Si)-Dissolved	3.19		0.050	mg/L	14-SEP-18	14-SEP-18	R4216533
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	14-SEP-18	R4216533
Sodium (Na)-Dissolved	10.9		0.050	mg/L	14-SEP-18	14-SEP-18	R4216533
Strontium (Sr)-Dissolved	0.737		0.00020	mg/L	14-SEP-18	14-SEP-18	R4216533
Thallium (Tl)-Dissolved	0.000056		0.000010	mg/L	14-SEP-18	14-SEP-18	R4216533
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	14-SEP-18	R4216533
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	14-SEP-18	R4216533
Uranium (U)-Dissolved	0.0123		0.000010	mg/L	14-SEP-18	14-SEP-18	R4216533
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	14-SEP-18	R4216533
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	14-SEP-18	14-SEP-18	R4216533
Hardness							
Hardness (as CaCO3)	1220		0.50	mg/L		14-SEP-18	
Total Metals in Water							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		14-SEP-18	R4216533
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0196		0.0030	mg/L		14-SEP-18	R4216533
Antimony (Sb)-Total	0.00380		0.00010	mg/L		14-SEP-18	R4216533
Arsenic (As)-Total	0.00023		0.00010	mg/L		14-SEP-18	R4216533
Barium (Ba)-Total	0.0466		0.00010	mg/L		14-SEP-18	R4216533
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		14-SEP-18	R4216533
Boron (B)-Total	0.021		0.010	mg/L		14-SEP-18	R4216533
Cadmium (Cd)-Total	0.0116		0.0050	ug/L		14-SEP-18	R4216533
Calcium (Ca)-Total	219		0.050	mg/L		14-SEP-18	R4216533
Chromium (Cr)-Total	0.00024		0.00010	mg/L		14-SEP-18	R4216533
Cobalt (Co)-Total	1.09		0.10	ug/L		14-SEP-18	R4216533
Copper (Cu)-Total	<0.00050		0.00050	mg/L		14-SEP-18	R4216533
Iron (Fe)-Total	0.019		0.010	mg/L		14-SEP-18	R4216533
Lead (Pb)-Total	<0.000050		0.000050	mg/L		14-SEP-18	R4216533
Lithium (Li)-Total	0.174		0.0010	mg/L		14-SEP-18	R4216533
Magnesium (Mg)-Total	167		0.10	mg/L		14-SEP-18	R4216533
Manganese (Mn)-Total	0.00382		0.00010	mg/L		14-SEP-18	R4216533
Molybdenum (Mo)-Total	0.0178		0.000050	mg/L		14-SEP-18	R4216533
Nickel (Ni)-Total	0.122		0.00050	mg/L		14-SEP-18	R4216533
Potassium (K)-Total	6.90		0.050	mg/L		14-SEP-18	R4216533
Selenium (Se)-Total	101		0.050	ug/L		14-SEP-18	R4216533
Silicon (Si)-Total	3.20		0.10	mg/L		14-SEP-18	R4216533
Silver (Ag)-Total	<0.000010		0.000010	mg/L		14-SEP-18	R4216533
Sodium (Na)-Total	10.9		0.050	mg/L		14-SEP-18	R4216533
Strontium (Sr)-Total	0.777		0.00020	mg/L		14-SEP-18	R4216533
Thallium (Tl)-Total	0.000056		0.000010	mg/L		14-SEP-18	R4216533
Tin (Sn)-Total	<0.00010		0.00010	mg/L		14-SEP-18	R4216533
Titanium (Ti)-Total	<0.010		0.010	mg/L		14-SEP-18	R4216533
Uranium (U)-Total	0.0123		0.000010	mg/L		14-SEP-18	R4216533
Vanadium (V)-Total	<0.00050		0.00050	mg/L		14-SEP-18	R4216533
Zinc (Zn)-Total	0.0059		0.0030	mg/L		14-SEP-18	R4216533
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	2.4		2.0	mg/L		14-SEP-18	R4216479
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	275		1.0	mg/L		13-SEP-18	R4216390
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		13-SEP-18	R4216390

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-4 GH_WC1_WS_2018-09-12_N							
Sampled By: CLIENT on 12-SEP-18 @ 09:40							
Matrix: WS							
Alkalinity (Species) by Manual Titration							
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		13-SEP-18	R4216390
Alkalinity, Total (as CaCO3)	275		1.0	mg/L		13-SEP-18	R4216390
Ammonia, Total (as N)							
Ammonia as N	<0.0050		0.0050	mg/L		14-SEP-18	R4216503
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLHC	0.25	mg/L		13-SEP-18	R4216076
Chloride in Water by IC							
Chloride (Cl)	4.4	DLHC	2.5	mg/L		13-SEP-18	R4216076
Electrical Conductivity (EC)							
Conductivity (@ 25C)	2040		2.0	uS/cm		13-SEP-18	R4216390
Fluoride in Water by IC							
Fluoride (F)	0.21	DLHC	0.10	mg/L		13-SEP-18	R4216076
Ion Balance Calculation							
Ion Balance	91.5		-100	%		14-SEP-18	
Ion Balance Calculation							
Cation - Anion Balance	-4.4			%		14-SEP-18	
Anion Sum	27.3			meq/L		14-SEP-18	
Cation Sum	24.9			meq/L		14-SEP-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	47.8	DLHC	0.025	mg/L		13-SEP-18	R4216076
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.0199	DLHC	0.0050	mg/L		13-SEP-18	R4216076
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010	HTD	0.0010	mg/L		13-SEP-18	R4216282
Oxidation redution potential by elect.							
ORP	304		-1000	mV		13-SEP-18	R4216073
Sulfate in Water by IC							
Sulfate (SO4)	874	DLHC	1.5	mg/L		13-SEP-18	R4216076
Total Dissolved Solids							
Total Dissolved Solids	1800	DLHC	20	mg/L		13-SEP-18	R4216327
Total Suspended Solids							
Total Suspended Solids	6.4		1.0	mg/L		13-SEP-18	R4216325
Turbidity							
Turbidity	5.44		0.10	NTU		13-SEP-18	R4216004
pH							
pH	8.28		0.10	pH		13-SEP-18	R4216390
L2163892-5 GH_WC1_WS_2018-09-12_FB-HG							
Sampled By: CLIENT on 12-SEP-18 @ 09:40							
Matrix: WS							
Miscellaneous Parameters							
Mercury (Hg)-Total	<0.00050		0.00050	ug/L		15-SEP-18	R4216914
L2163892-6 GH_FR1_WS_2018-09-12_N							
Sampled By: CLIENT on 12-SEP-18 @ 12:30							
Matrix: WS							
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	14-SEP-18	15-SEP-18	R4216828
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-6 GH_FR1_WS_2018-09-12_N							
Sampled By: CLIENT on 12-SEP-18 @ 12:30							
Matrix: WS							
Dissolved Metals in Water by CRC ICPMS							
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	14-SEP-18	15-SEP-18	R4216828
Antimony (Sb)-Dissolved	0.00012		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Barium (Ba)-Dissolved	0.113		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Boron (B)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cadmium (Cd)-Dissolved	0.0184		0.0050	ug/L	14-SEP-18	15-SEP-18	R4216828
Calcium (Ca)-Dissolved	94.1		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Chromium (Cr)-Dissolved	0.00013		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	14-SEP-18	15-SEP-18	R4216828
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Lithium (Li)-Dissolved	0.0178		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Magnesium (Mg)-Dissolved	44.2		0.10	mg/L	14-SEP-18	15-SEP-18	R4216828
Manganese (Mn)-Dissolved	0.00144		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Molybdenum (Mo)-Dissolved	0.00101		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Nickel (Ni)-Dissolved	0.00118		0.00050	mg/L	14-SEP-18	16-SEP-18	R4217614
Potassium (K)-Dissolved	1.17		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Selenium (Se)-Dissolved	51.3		0.050	ug/L	14-SEP-18	15-SEP-18	R4216828
Silicon (Si)-Dissolved	2.11		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Sodium (Na)-Dissolved	2.15		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Strontium (Sr)-Dissolved	0.142		0.00020	mg/L	14-SEP-18	15-SEP-18	R4216828
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Uranium (U)-Dissolved	0.00215		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Hardness							
Hardness (as CaCO3)	417		0.50	mg/L		17-SEP-18	
Total Metals in Water							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		15-SEP-18	R4216828
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0060		0.0030	mg/L		15-SEP-18	R4216828
Antimony (Sb)-Total	0.00014		0.00010	mg/L		15-SEP-18	R4216828
Arsenic (As)-Total	0.00016		0.00010	mg/L		15-SEP-18	R4216828
Barium (Ba)-Total	0.109		0.00010	mg/L		15-SEP-18	R4216828
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		15-SEP-18	R4216828
Boron (B)-Total	<0.010		0.010	mg/L		15-SEP-18	R4216828
Cadmium (Cd)-Total	0.0213		0.0050	ug/L		15-SEP-18	R4216828
Calcium (Ca)-Total	95.4		0.050	mg/L		15-SEP-18	R4216828
Chromium (Cr)-Total	0.00013		0.00010	mg/L		15-SEP-18	R4216828
Cobalt (Co)-Total	<0.10		0.10	ug/L		15-SEP-18	R4216828
Copper (Cu)-Total	<0.00050		0.00050	mg/L		15-SEP-18	R4216828
Iron (Fe)-Total	0.012		0.010	mg/L		15-SEP-18	R4216828
Lead (Pb)-Total	<0.000050		0.000050	mg/L		15-SEP-18	R4216828
Lithium (Li)-Total	0.0185		0.0010	mg/L		15-SEP-18	R4216828
Magnesium (Mg)-Total	43.7		0.10	mg/L		15-SEP-18	R4216828
Manganese (Mn)-Total	0.00207		0.00010	mg/L		15-SEP-18	R4216828

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-6 GH_FR1_WS_2018-09-12_N							
Sampled By: CLIENT on 12-SEP-18 @ 12:30							
Matrix: WS							
Total Metals in Water by CRC ICPMS							
Molybdenum (Mo)-Total	0.00105		0.000050	mg/L		15-SEP-18	R4216828
Nickel (Ni)-Total	0.00080		0.00050	mg/L		15-SEP-18	R4216828
Potassium (K)-Total	1.19		0.050	mg/L		15-SEP-18	R4216828
Selenium (Se)-Total	46.8		0.050	ug/L		15-SEP-18	R4216828
Silicon (Si)-Total	2.23		0.10	mg/L		15-SEP-18	R4216828
Silver (Ag)-Total	<0.000010		0.000010	mg/L		15-SEP-18	R4216828
Sodium (Na)-Total	2.18		0.050	mg/L		15-SEP-18	R4216828
Strontium (Sr)-Total	0.145		0.00020	mg/L		15-SEP-18	R4216828
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		15-SEP-18	R4216828
Tin (Sn)-Total	<0.00010		0.00010	mg/L		15-SEP-18	R4216828
Titanium (Ti)-Total	<0.010		0.010	mg/L		15-SEP-18	R4216828
Uranium (U)-Total	0.00217		0.000010	mg/L		15-SEP-18	R4216828
Vanadium (V)-Total	<0.00050		0.00050	mg/L		15-SEP-18	R4216828
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		15-SEP-18	R4216828
L2163892-7 GH_ER1_WS_2018-09-12_N							
Sampled By: CLIENT on 12-SEP-18 @ 12:50							
Matrix: WS							
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	14-SEP-18	15-SEP-18	R4216828
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	14-SEP-18	15-SEP-18	R4216828
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Barium (Ba)-Dissolved	0.0570		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Boron (B)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cadmium (Cd)-Dissolved	0.0074		0.0050	ug/L	14-SEP-18	15-SEP-18	R4216828
Calcium (Ca)-Dissolved	47.7		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Chromium (Cr)-Dissolved	0.00023		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	14-SEP-18	15-SEP-18	R4216828
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Lithium (Li)-Dissolved	0.0026		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Magnesium (Mg)-Dissolved	12.0		0.10	mg/L	14-SEP-18	15-SEP-18	R4216828
Manganese (Mn)-Dissolved	0.00066		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Molybdenum (Mo)-Dissolved	0.00102		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Potassium (K)-Dissolved	0.400		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Selenium (Se)-Dissolved	1.82		0.050	ug/L	14-SEP-18	15-SEP-18	R4216828
Silicon (Si)-Dissolved	1.86		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Sodium (Na)-Dissolved	0.894		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Strontium (Sr)-Dissolved	0.200		0.00020	mg/L	14-SEP-18	15-SEP-18	R4216828
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-7 GH_ER1_WS_2018-09-12_N							
Sampled By: CLIENT on 12-SEP-18 @ 12:50							
Matrix: WS							
Dissolved Metals in Water by CRC ICPMS							
Uranium (U)-Dissolved	0.000753		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Hardness							
Hardness (as CaCO3)	168		0.50	mg/L		15-SEP-18	
Total Metals in Water							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		15-SEP-18	R4216828
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0033		0.0030	mg/L		15-SEP-18	R4216828
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		15-SEP-18	R4216828
Arsenic (As)-Total	0.00014		0.00010	mg/L		15-SEP-18	R4216828
Barium (Ba)-Total	0.0564		0.00010	mg/L		15-SEP-18	R4216828
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		15-SEP-18	R4216828
Boron (B)-Total	<0.010		0.010	mg/L		15-SEP-18	R4216828
Cadmium (Cd)-Total	0.0060		0.0050	ug/L		15-SEP-18	R4216828
Calcium (Ca)-Total	48.1		0.050	mg/L		15-SEP-18	R4216828
Chromium (Cr)-Total	0.00024		0.00010	mg/L		15-SEP-18	R4216828
Cobalt (Co)-Total	<0.10		0.10	ug/L		15-SEP-18	R4216828
Copper (Cu)-Total	<0.00050		0.00050	mg/L		15-SEP-18	R4216828
Iron (Fe)-Total	<0.010		0.010	mg/L		15-SEP-18	R4216828
Lead (Pb)-Total	<0.000050		0.000050	mg/L		15-SEP-18	R4216828
Lithium (Li)-Total	0.0026		0.0010	mg/L		15-SEP-18	R4216828
Magnesium (Mg)-Total	12.0		0.10	mg/L		15-SEP-18	R4216828
Manganese (Mn)-Total	0.00096		0.00010	mg/L		15-SEP-18	R4216828
Molybdenum (Mo)-Total	0.00105		0.000050	mg/L		15-SEP-18	R4216828
Nickel (Ni)-Total	<0.00050		0.00050	mg/L		15-SEP-18	R4216828
Potassium (K)-Total	0.402		0.050	mg/L		15-SEP-18	R4216828
Selenium (Se)-Total	1.67		0.050	ug/L		15-SEP-18	R4216828
Silicon (Si)-Total	1.92		0.10	mg/L		15-SEP-18	R4216828
Silver (Ag)-Total	<0.000010		0.000010	mg/L		15-SEP-18	R4216828
Sodium (Na)-Total	0.921		0.050	mg/L		15-SEP-18	R4216828
Strontium (Sr)-Total	0.198		0.00020	mg/L		15-SEP-18	R4216828
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		15-SEP-18	R4216828
Tin (Sn)-Total	<0.00010		0.00010	mg/L		15-SEP-18	R4216828
Titanium (Ti)-Total	<0.010		0.010	mg/L		15-SEP-18	R4216828
Uranium (U)-Total	0.000778		0.000010	mg/L		15-SEP-18	R4216828
Vanadium (V)-Total	<0.00050		0.00050	mg/L		15-SEP-18	R4216828
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		15-SEP-18	R4216828
L2163892-8 GH_ERC_WS_2018-09-12_N							
Sampled By: CLIENT on 12-SEP-18 @ 13:25							
Matrix: WS							
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	14-SEP-18	15-SEP-18	R4216828
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					14-SEP-18	R4216681
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	14-SEP-18	15-SEP-18	R4216828
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-8 GH_ERC_WS_2018-09-12_N							
Sampled By: CLIENT on 12-SEP-18 @ 13:25							
Matrix: WS							
Dissolved Metals in Water by CRC ICPMS							
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Barium (Ba)-Dissolved	0.0564		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Boron (B)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cadmium (Cd)-Dissolved	0.0058		0.0050	ug/L	14-SEP-18	15-SEP-18	R4216828
Calcium (Ca)-Dissolved	47.5		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Chromium (Cr)-Dissolved	0.00024		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	14-SEP-18	15-SEP-18	R4216828
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Lithium (Li)-Dissolved	0.0026		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Magnesium (Mg)-Dissolved	12.0		0.10	mg/L	14-SEP-18	15-SEP-18	R4216828
Manganese (Mn)-Dissolved	0.00057		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Molybdenum (Mo)-Dissolved	0.00101		0.000050	mg/L	14-SEP-18	15-SEP-18	R4216828
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Potassium (K)-Dissolved	0.405		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Selenium (Se)-Dissolved	1.70		0.050	ug/L	14-SEP-18	15-SEP-18	R4216828
Silicon (Si)-Dissolved	1.87		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Sodium (Na)-Dissolved	0.820		0.050	mg/L	14-SEP-18	15-SEP-18	R4216828
Strontium (Sr)-Dissolved	0.202		0.00020	mg/L	14-SEP-18	15-SEP-18	R4216828
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	14-SEP-18	15-SEP-18	R4216828
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	14-SEP-18	15-SEP-18	R4216828
Uranium (U)-Dissolved	0.000736		0.000010	mg/L	14-SEP-18	15-SEP-18	R4216828
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	14-SEP-18	15-SEP-18	R4216828
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	14-SEP-18	15-SEP-18	R4216828
Hardness							
Hardness (as CaCO3)	168		0.50	mg/L		17-SEP-18	
Total Metals in Water							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		16-SEP-18	R4217619
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0046		0.0030	mg/L		16-SEP-18	R4217619
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		16-SEP-18	R4217619
Arsenic (As)-Total	0.00018		0.00010	mg/L		16-SEP-18	R4217619
Barium (Ba)-Total	0.0510		0.00010	mg/L		16-SEP-18	R4217619
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		16-SEP-18	R4217619
Boron (B)-Total	<0.010		0.010	mg/L		16-SEP-18	R4217619
Cadmium (Cd)-Total	0.0058		0.0050	ug/L		16-SEP-18	R4217619
Calcium (Ca)-Total	44.8		0.050	mg/L		16-SEP-18	R4217619
Chromium (Cr)-Total	0.00025		0.00010	mg/L		16-SEP-18	R4217619
Cobalt (Co)-Total	<0.10		0.10	ug/L		16-SEP-18	R4217619
Copper (Cu)-Total	<0.00050		0.00050	mg/L		16-SEP-18	R4217619
Iron (Fe)-Total	<0.010		0.010	mg/L		16-SEP-18	R4217619
Lead (Pb)-Total	<0.000050		0.000050	mg/L		16-SEP-18	R4217619
Lithium (Li)-Total	0.0025		0.0010	mg/L		16-SEP-18	R4217619
Magnesium (Mg)-Total	10.9		0.10	mg/L		16-SEP-18	R4217619
Manganese (Mn)-Total	0.00095		0.00010	mg/L		16-SEP-18	R4217619
Molybdenum (Mo)-Total	0.00105		0.000050	mg/L		16-SEP-18	R4217619
Nickel (Ni)-Total	<0.00050		0.00050	mg/L		16-SEP-18	R4217619

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2163892-8 GH_ERC_WS_2018-09-12_N							
Sampled By: CLIENT on 12-SEP-18 @ 13:25							
Matrix: WS							
Total Metals in Water by CRC ICPMS							
Potassium (K)-Total	0.370		0.050	mg/L		16-SEP-18	R4217619
Selenium (Se)-Total	1.56		0.050	ug/L		16-SEP-18	R4217619
Silicon (Si)-Total	1.85		0.10	mg/L		16-SEP-18	R4217619
Silver (Ag)-Total	<0.000010		0.000010	mg/L		16-SEP-18	R4217619
Sodium (Na)-Total	0.741		0.050	mg/L		16-SEP-18	R4217619
Strontium (Sr)-Total	0.195		0.00020	mg/L		16-SEP-18	R4217619
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		16-SEP-18	R4217619
Tin (Sn)-Total	<0.00010		0.00010	mg/L		16-SEP-18	R4217619
Titanium (Ti)-Total	<0.010		0.010	mg/L		16-SEP-18	R4217619
Uranium (U)-Total	0.000694		0.000010	mg/L		16-SEP-18	R4217619
Vanadium (V)-Total	<0.00050		0.00050	mg/L		16-SEP-18	R4217619
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		16-SEP-18	R4217619

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental
This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide. The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC. TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.			
C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide. The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC. TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.			
CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B
Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.			
F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents.			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA	Water	Total Mercury in Water by CVAFS (Ultra)	EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-T-L-COL-ED	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C
A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).			
TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E
Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.			
Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:			
Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]			
TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)
This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.			
TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.			
TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer
This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

QTR_GW_2018-09-03

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TECK COAL LIMITED (GREENHILLS)
BOX 5000
ELKFORD BC V0B1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4216479								
WG2877142-2 LCS								
Acidity (as CaCO3)			99.1		%		85-115	14-SEP-18
WG2877142-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		4	14-SEP-18
Batch R4227995								
WG2882050-17 LCS								
Acidity (as CaCO3)			103.6		%		85-115	19-SEP-18
WG2882050-16 MB								
Acidity (as CaCO3)			1.9		mg/L		2	19-SEP-18
ALK-MAN-CL	**Water**							
Batch R4216390								
WG2876549-38 LCS								
Alkalinity, Total (as CaCO3)			101.6		%		85-115	13-SEP-18
WG2876549-37 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	13-SEP-18
BE-D-L-CCMS-VA	**Water**							
Batch R4216533								
WG2877041-3 DUP		**L2163892-4**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	14-SEP-18
WG2877041-2 LCS								
Beryllium (Be)-Dissolved			92.6		%		80-120	14-SEP-18
WG2877041-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	14-SEP-18
Batch R4216828								
WG2877378-2 LCS								
Beryllium (Be)-Dissolved			96.8		%		80-120	15-SEP-18
WG2877378-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	15-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4216533								
WG2877025-3 DUP		**L2163892-4**						
Beryllium (Be)-Total		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	14-SEP-18
WG2877025-2 LCS								
Beryllium (Be)-Total			93.3		%		80-120	14-SEP-18
WG2877025-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	14-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BE-T-L-CCMS-VA	**Water**							
Batch R4216828								
WG2877214-2 LCS								
Beryllium (Be)-Total			94.5		%		80-120	15-SEP-18
WG2877214-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	15-SEP-18
Batch R4217619								
WG2877584-3 DUP		**L2163892-8**						
Beryllium (Be)-Total		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	16-SEP-18
WG2877584-2 LCS								
Beryllium (Be)-Total			92.2		%		80-120	16-SEP-18
WG2877584-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	16-SEP-18
BR-L-IC-N-CL	**Water**							
Batch R4216076								
WG2876717-14 LCS								
Bromide (Br)			94.1		%		85-115	13-SEP-18
WG2876717-13 MB								
Bromide (Br)			<0.050		mg/L		0.05	13-SEP-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4216218								
WG2876863-6 LCS								
Dissolved Organic Carbon			101.5		%		80-120	13-SEP-18
WG2876863-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	13-SEP-18
Batch R4230683								
WG2883155-2 LCS								
Dissolved Organic Carbon			102.2		%		80-120	20-SEP-18
WG2883155-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	20-SEP-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4216218								
WG2876863-6 LCS								
Total Organic Carbon			94.7		%		80-120	13-SEP-18
WG2876863-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-SEP-18
Batch R4230683								
WG2883155-2 LCS								
Total Organic Carbon			104.3		%		80-120	20-SEP-18
WG2883155-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4230683								
WG2883155-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	20-SEP-18
Batch R4233388								
WG2883965-2 LCS								
Total Organic Carbon			103.5		%		80-120	21-SEP-18
WG2883965-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	21-SEP-18
CL-IC-N-CL	**Water**							
Batch R4216076								
WG2876717-14 LCS								
Chloride (Cl)			101.7		%		90-110	13-SEP-18
WG2876717-13 MB								
Chloride (Cl)			<0.50		mg/L		0.5	13-SEP-18
EC-L-PCT-CL	**Water**							
Batch R4216390								
WG2876549-38 LCS								
Conductivity (@ 25C)			102.9		%		90-110	13-SEP-18
WG2876549-37 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	13-SEP-18
F-IC-N-CL	**Water**							
Batch R4216076								
WG2876717-14 LCS								
Fluoride (F)			108.2		%		90-110	13-SEP-18
WG2876717-13 MB								
Fluoride (F)			<0.020		mg/L		0.02	13-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4215871								
WG2877019-3 DUP		**L2163892-4**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	14-SEP-18
WG2877019-2 LCS								
Mercury (Hg)-Dissolved			102.4		%		80-120	14-SEP-18
WG2877019-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	14-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R4217728								
WG2877433-10 LCS								
Mercury (Hg)-Dissolved			99.5		%		80-120	17-SEP-18
WG2877433-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	17-SEP-18
HG-T-CVAA-VA	**Water**							
Batch R4218256								
WG2879160-2 LCS								
Mercury (Hg)-Total			102.7		%		80-120	18-SEP-18
WG2879160-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	18-SEP-18
HG-T-U-CVAF-VA	**Water**							
Batch R4216914								
WG2877647-2 LCS								
Mercury (Hg)-Total			106.0		%		80-120	15-SEP-18
WG2877647-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	15-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4216533								
WG2877041-3 DUP		**L2163892-4**						
Aluminum (Al)-Dissolved		0.0247	0.0260		mg/L	5.0	20	14-SEP-18
Antimony (Sb)-Dissolved		0.00367	0.00375		mg/L	2.2	20	14-SEP-18
Arsenic (As)-Dissolved		0.00021	0.00023		mg/L	6.3	20	14-SEP-18
Barium (Ba)-Dissolved		0.0437	0.0434		mg/L	0.7	20	14-SEP-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	14-SEP-18
Boron (B)-Dissolved		0.022	0.021		mg/L	4.9	20	14-SEP-18
Cadmium (Cd)-Dissolved		0.0000052	<0.000005C	RPD-NA	mg/L	N/A	20	14-SEP-18
Calcium (Ca)-Dissolved		217	215		mg/L	0.8	20	14-SEP-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	14-SEP-18
Cobalt (Co)-Dissolved		0.00103	0.00101		mg/L	1.8	20	14-SEP-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	14-SEP-18
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	14-SEP-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	14-SEP-18
Lithium (Li)-Dissolved		0.185	0.172		mg/L	7.1	20	14-SEP-18
Magnesium (Mg)-Dissolved		164	160		mg/L	2.1	20	14-SEP-18
Manganese (Mn)-Dissolved		0.00289	0.00288		mg/L	0.3	20	14-SEP-18
Molybdenum (Mo)-Dissolved		0.0169	0.0172		mg/L	1.9	20	14-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4216533								
WG2877041-3 DUP		**L2163892-4**						
Nickel (Ni)-Dissolved		0.117	0.117		mg/L	0.0	20	14-SEP-18
Potassium (K)-Dissolved		6.71	6.77		mg/L	0.9	20	14-SEP-18
Selenium (Se)-Dissolved		0.119	0.119		mg/L	0.3	20	14-SEP-18
Silicon (Si)-Dissolved		3.19	3.09		mg/L	3.3	20	14-SEP-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	14-SEP-18
Sodium (Na)-Dissolved		10.9	10.7		mg/L	1.3	20	14-SEP-18
Strontium (Sr)-Dissolved		0.737	0.750		mg/L	1.7	20	14-SEP-18
Thallium (Tl)-Dissolved		0.000056	0.000056		mg/L	1.1	20	14-SEP-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	14-SEP-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	14-SEP-18
Uranium (U)-Dissolved		0.0123	0.0123		mg/L	0.3	20	14-SEP-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	14-SEP-18
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	14-SEP-18
WG2877041-2 LCS								
Aluminum (Al)-Dissolved			95.3		%		80-120	14-SEP-18
Antimony (Sb)-Dissolved			97.8		%		80-120	14-SEP-18
Arsenic (As)-Dissolved			93.7		%		80-120	14-SEP-18
Barium (Ba)-Dissolved			92.8		%		80-120	14-SEP-18
Bismuth (Bi)-Dissolved			96.5		%		80-120	14-SEP-18
Boron (B)-Dissolved			91.9		%		80-120	14-SEP-18
Cadmium (Cd)-Dissolved			97.5		%		80-120	14-SEP-18
Calcium (Ca)-Dissolved			91.3		%		80-120	14-SEP-18
Chromium (Cr)-Dissolved			92.7		%		80-120	14-SEP-18
Cobalt (Co)-Dissolved			92.6		%		80-120	14-SEP-18
Copper (Cu)-Dissolved			91.4		%		80-120	14-SEP-18
Iron (Fe)-Dissolved			92.1		%		80-120	14-SEP-18
Lead (Pb)-Dissolved			95.9		%		80-120	14-SEP-18
Lithium (Li)-Dissolved			93.1		%		80-120	14-SEP-18
Magnesium (Mg)-Dissolved			98.1		%		80-120	14-SEP-18
Manganese (Mn)-Dissolved			93.7		%		80-120	14-SEP-18
Molybdenum (Mo)-Dissolved			98.7		%		80-120	14-SEP-18
Nickel (Ni)-Dissolved			92.3		%		80-120	14-SEP-18
Potassium (K)-Dissolved			94.4		%		80-120	14-SEP-18
Selenium (Se)-Dissolved			95.9		%		80-120	14-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4216533								
WG2877041-2 LCS								
Silicon (Si)-Dissolved			93.0		%		60-140	14-SEP-18
Silver (Ag)-Dissolved			93.1		%		80-120	14-SEP-18
Sodium (Na)-Dissolved			98.5		%		80-120	14-SEP-18
Strontium (Sr)-Dissolved			95.9		%		80-120	14-SEP-18
Thallium (Tl)-Dissolved			96.6		%		80-120	14-SEP-18
Tin (Sn)-Dissolved			95.8		%		80-120	14-SEP-18
Titanium (Ti)-Dissolved			87.3		%		80-120	14-SEP-18
Uranium (U)-Dissolved			93.8		%		80-120	14-SEP-18
Vanadium (V)-Dissolved			95.2		%		80-120	14-SEP-18
Zinc (Zn)-Dissolved			89.7		%		80-120	14-SEP-18
WG2877041-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	14-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	14-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	14-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	14-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	14-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	14-SEP-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	14-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	14-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	14-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	14-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	14-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	14-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	14-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	14-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	14-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	14-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	14-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	14-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	14-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	14-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	14-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	14-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	14-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4216533								
WG2877041-1 MB		**NP**						
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	14-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	14-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	14-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	14-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	14-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	14-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	14-SEP-18
Batch R4216828								
WG2877378-2 LCS								
Aluminum (Al)-Dissolved			97.8		%		80-120	15-SEP-18
Antimony (Sb)-Dissolved			102.1		%		80-120	15-SEP-18
Arsenic (As)-Dissolved			98.5		%		80-120	15-SEP-18
Barium (Ba)-Dissolved			99.3		%		80-120	15-SEP-18
Bismuth (Bi)-Dissolved			105.3		%		80-120	15-SEP-18
Boron (B)-Dissolved			88.0		%		80-120	15-SEP-18
Cadmium (Cd)-Dissolved			96.9		%		80-120	15-SEP-18
Calcium (Ca)-Dissolved			98.2		%		80-120	15-SEP-18
Chromium (Cr)-Dissolved			98.7		%		80-120	15-SEP-18
Cobalt (Co)-Dissolved			95.5		%		80-120	15-SEP-18
Copper (Cu)-Dissolved			95.6		%		80-120	15-SEP-18
Iron (Fe)-Dissolved			94.5		%		80-120	15-SEP-18
Lead (Pb)-Dissolved			97.1		%		80-120	15-SEP-18
Lithium (Li)-Dissolved			97.0		%		80-120	15-SEP-18
Magnesium (Mg)-Dissolved			98.1		%		80-120	15-SEP-18
Manganese (Mn)-Dissolved			96.7		%		80-120	15-SEP-18
Molybdenum (Mo)-Dissolved			95.3		%		80-120	15-SEP-18
Nickel (Ni)-Dissolved			99.2		%		80-120	15-SEP-18
Potassium (K)-Dissolved			98.1		%		80-120	15-SEP-18
Selenium (Se)-Dissolved			94.7		%		80-120	15-SEP-18
Silicon (Si)-Dissolved			102.8		%		60-140	15-SEP-18
Silver (Ag)-Dissolved			98.8		%		80-120	15-SEP-18
Sodium (Na)-Dissolved			102.5		%		80-120	15-SEP-18
Strontium (Sr)-Dissolved			97.4		%		80-120	15-SEP-18
Thallium (Tl)-Dissolved			97.8		%		80-120	15-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4216828								
WG2877378-2 LCS								
Tin (Sn)-Dissolved			97.5		%		80-120	15-SEP-18
Titanium (Ti)-Dissolved			95.5		%		80-120	15-SEP-18
Uranium (U)-Dissolved			98.3		%		80-120	15-SEP-18
Vanadium (V)-Dissolved			98.7		%		80-120	15-SEP-18
Zinc (Zn)-Dissolved			97.8		%		80-120	15-SEP-18
WG2877378-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	15-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	15-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	15-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	15-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	15-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	15-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	15-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	15-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	15-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	15-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	15-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	15-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	15-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	15-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	15-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	15-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	15-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	15-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	15-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	15-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	15-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	15-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	15-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	15-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	15-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	15-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	15-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	15-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4216828								
WG2877378-1 MB		**NP**						
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	15-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	15-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4216533								
WG2877025-3 DUP		**L2163892-4**						
Aluminum (Al)-Total		0.0196	0.0161		mg/L	20	20	14-SEP-18
Antimony (Sb)-Total		0.00380	0.00374		mg/L	1.6	20	14-SEP-18
Arsenic (As)-Total		0.00023	0.00024		mg/L	5.8	20	14-SEP-18
Barium (Ba)-Total		0.0466	0.0451		mg/L	3.3	20	14-SEP-18
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	14-SEP-18
Boron (B)-Total		0.021	0.021		mg/L	2.5	20	14-SEP-18
Cadmium (Cd)-Total		0.0000116	0.0000084	J	mg/L	0.000003	0.00001	14-SEP-18
Calcium (Ca)-Total		219	220		mg/L	0.5	20	14-SEP-18
Chromium (Cr)-Total		0.00024	0.00027		mg/L	12	20	14-SEP-18
Cobalt (Co)-Total		0.00109	0.00112		mg/L	2.3	20	14-SEP-18
Copper (Cu)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	14-SEP-18
Iron (Fe)-Total		0.019	0.018		mg/L	5.7	20	14-SEP-18
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	14-SEP-18
Lithium (Li)-Total		0.174	0.166		mg/L	4.6	20	14-SEP-18
Magnesium (Mg)-Total		167	167		mg/L	0.1	20	14-SEP-18
Manganese (Mn)-Total		0.00382	0.00379		mg/L	0.7	20	14-SEP-18
Molybdenum (Mo)-Total		0.0178	0.0175		mg/L	2.0	20	14-SEP-18
Nickel (Ni)-Total		0.122	0.122		mg/L	0.1	20	14-SEP-18
Potassium (K)-Total		6.90	6.74		mg/L	2.4	20	14-SEP-18
Selenium (Se)-Total		0.101	0.102		mg/L	0.7	20	14-SEP-18
Silicon (Si)-Total		3.20	3.03		mg/L	5.2	20	14-SEP-18
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	14-SEP-18
Sodium (Na)-Total		10.9	10.9		mg/L	0.6	20	14-SEP-18
Strontium (Sr)-Total		0.777	0.765		mg/L	1.5	20	14-SEP-18
Thallium (Tl)-Total		0.000056	0.000054		mg/L	3.0	20	14-SEP-18
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	14-SEP-18
Titanium (Ti)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	14-SEP-18
Uranium (U)-Total		0.0123	0.0123		mg/L	0.4	20	14-SEP-18
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	14-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4216533								
WG2877025-3 DUP		**L2163892-4**						
Zinc (Zn)-Total		0.0059	0.0058		mg/L	1.6	20	14-SEP-18
WG2877025-2 LCS								
Aluminum (Al)-Total			98.4		%		80-120	14-SEP-18
Antimony (Sb)-Total			98.6		%		80-120	14-SEP-18
Arsenic (As)-Total			98.3		%		80-120	14-SEP-18
Barium (Ba)-Total			100.4		%		80-120	14-SEP-18
Bismuth (Bi)-Total			98.3		%		80-120	14-SEP-18
Boron (B)-Total			88.7		%		80-120	14-SEP-18
Cadmium (Cd)-Total			101.8		%		80-120	14-SEP-18
Calcium (Ca)-Total			92.7		%		80-120	14-SEP-18
Chromium (Cr)-Total			96.8		%		80-120	14-SEP-18
Cobalt (Co)-Total			96.2		%		80-120	14-SEP-18
Copper (Cu)-Total			97.1		%		80-120	14-SEP-18
Iron (Fe)-Total			95.7		%		80-120	14-SEP-18
Lead (Pb)-Total			97.6		%		80-120	14-SEP-18
Lithium (Li)-Total			92.3		%		80-120	14-SEP-18
Magnesium (Mg)-Total			100.2		%		80-120	14-SEP-18
Manganese (Mn)-Total			95.4		%		80-120	14-SEP-18
Molybdenum (Mo)-Total			98.8		%		80-120	14-SEP-18
Nickel (Ni)-Total			96.9		%		80-120	14-SEP-18
Potassium (K)-Total			92.3		%		80-120	14-SEP-18
Selenium (Se)-Total			104.4		%		80-120	14-SEP-18
Silicon (Si)-Total			93.7		%		80-120	14-SEP-18
Silver (Ag)-Total			94.3		%		80-120	14-SEP-18
Sodium (Na)-Total			97.2		%		80-120	14-SEP-18
Strontium (Sr)-Total			97.2		%		80-120	14-SEP-18
Thallium (Tl)-Total			97.7		%		80-120	14-SEP-18
Tin (Sn)-Total			96.6		%		80-120	14-SEP-18
Titanium (Ti)-Total			90.4		%		80-120	14-SEP-18
Uranium (U)-Total			97.6		%		80-120	14-SEP-18
Vanadium (V)-Total			98.1		%		80-120	14-SEP-18
Zinc (Zn)-Total			97.2		%		80-120	14-SEP-18
WG2877025-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	14-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	14-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4216533								
WG2877025-1 MB								
Arsenic (As)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	14-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	14-SEP-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	14-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	14-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	14-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	14-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	14-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	14-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	14-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	14-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	14-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	14-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	14-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	14-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	14-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	14-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	14-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	14-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	14-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	14-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	14-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	14-SEP-18
Batch R4216828								
WG2877214-2 LCS								
Aluminum (Al)-Total			95.2		%		80-120	15-SEP-18
Antimony (Sb)-Total			97.4		%		80-120	15-SEP-18
Arsenic (As)-Total			96.2		%		80-120	15-SEP-18
Barium (Ba)-Total			100.1		%		80-120	15-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4216828								
WG2877214-2 LCS								
Bismuth (Bi)-Total			93.9		%		80-120	15-SEP-18
Boron (B)-Total			88.4		%		80-120	15-SEP-18
Cadmium (Cd)-Total			94.5		%		80-120	15-SEP-18
Calcium (Ca)-Total			98.1		%		80-120	15-SEP-18
Chromium (Cr)-Total			96.7		%		80-120	15-SEP-18
Cobalt (Co)-Total			94.9		%		80-120	15-SEP-18
Copper (Cu)-Total			94.7		%		80-120	15-SEP-18
Iron (Fe)-Total			98.0		%		80-120	15-SEP-18
Lead (Pb)-Total			92.2		%		80-120	15-SEP-18
Lithium (Li)-Total			96.0		%		80-120	15-SEP-18
Magnesium (Mg)-Total			95.6		%		80-120	15-SEP-18
Manganese (Mn)-Total			94.5		%		80-120	15-SEP-18
Molybdenum (Mo)-Total			92.4		%		80-120	15-SEP-18
Nickel (Ni)-Total			96.1		%		80-120	15-SEP-18
Potassium (K)-Total			98.3		%		80-120	15-SEP-18
Selenium (Se)-Total			92.9		%		80-120	15-SEP-18
Silicon (Si)-Total			94.0		%		80-120	15-SEP-18
Silver (Ag)-Total			94.4		%		80-120	15-SEP-18
Sodium (Na)-Total			100.8		%		80-120	15-SEP-18
Strontium (Sr)-Total			94.8		%		80-120	15-SEP-18
Thallium (Tl)-Total			92.8		%		80-120	15-SEP-18
Tin (Sn)-Total			93.9		%		80-120	15-SEP-18
Titanium (Ti)-Total			94.8		%		80-120	15-SEP-18
Uranium (U)-Total			93.9		%		80-120	15-SEP-18
Vanadium (V)-Total			97.5		%		80-120	15-SEP-18
Zinc (Zn)-Total			98.4		%		80-120	15-SEP-18
WG2877214-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	15-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	15-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	15-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	15-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	15-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	15-SEP-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	15-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4216828								
WG2877214-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	15-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	15-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	15-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	15-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	15-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	15-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	15-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	15-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	15-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	15-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	15-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	15-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	15-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	15-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	15-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	15-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	15-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	15-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	15-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	15-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	15-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	15-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	15-SEP-18
Batch R4217619								
WG2877584-3 DUP		**L2163892-8**						
Aluminum (Al)-Total		0.0046	0.0054		mg/L	16	20	16-SEP-18
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	16-SEP-18
Arsenic (As)-Total		0.00018	0.00018		mg/L	0.4	20	16-SEP-18
Barium (Ba)-Total		0.0510	0.0527		mg/L	3.3	20	16-SEP-18
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	16-SEP-18
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	16-SEP-18
Cadmium (Cd)-Total		0.0000058	0.0000082	J	mg/L	0.000002	0.00001	16-SEP-18
Calcium (Ca)-Total		44.8	45.6		mg/L	1.7	20	16-SEP-18
Chromium (Cr)-Total		0.00025	0.00023		mg/L	5.2	20	16-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4217619								
WG2877584-3 DUP		**L2163892-8**						
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	16-SEP-18
Copper (Cu)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	16-SEP-18
Iron (Fe)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	16-SEP-18
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	16-SEP-18
Lithium (Li)-Total		0.0025	0.0026		mg/L	2.8	20	16-SEP-18
Magnesium (Mg)-Total		10.9	11.2		mg/L	2.9	20	16-SEP-18
Manganese (Mn)-Total		0.00095	0.00093		mg/L	2.3	20	16-SEP-18
Molybdenum (Mo)-Total		0.00105	0.00105		mg/L	0.5	20	16-SEP-18
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	16-SEP-18
Potassium (K)-Total		0.370	0.372		mg/L	0.5	20	16-SEP-18
Selenium (Se)-Total		0.00156	0.00160		mg/L	2.6	20	16-SEP-18
Silicon (Si)-Total		1.85	1.87		mg/L	1.1	20	16-SEP-18
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	16-SEP-18
Sodium (Na)-Total		0.741	0.759		mg/L	2.5	20	16-SEP-18
Strontium (Sr)-Total		0.195	0.198		mg/L	1.5	20	16-SEP-18
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	16-SEP-18
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	16-SEP-18
Titanium (Ti)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	16-SEP-18
Uranium (U)-Total		0.000694	0.000679		mg/L	2.2	20	16-SEP-18
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	16-SEP-18
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	16-SEP-18
WG2877584-2 LCS								
Aluminum (Al)-Total			94.5		%		80-120	16-SEP-18
Antimony (Sb)-Total			93.0		%		80-120	16-SEP-18
Arsenic (As)-Total			96.7		%		80-120	16-SEP-18
Barium (Ba)-Total			95.7		%		80-120	16-SEP-18
Bismuth (Bi)-Total			95.4		%		80-120	16-SEP-18
Boron (B)-Total			91.1		%		80-120	16-SEP-18
Cadmium (Cd)-Total			95.7		%		80-120	16-SEP-18
Calcium (Ca)-Total			93.9		%		80-120	16-SEP-18
Chromium (Cr)-Total			94.5		%		80-120	16-SEP-18
Cobalt (Co)-Total			92.2		%		80-120	16-SEP-18
Copper (Cu)-Total			91.6		%		80-120	16-SEP-18
Iron (Fe)-Total			96.8		%		80-120	16-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4217619								
WG2877584-2 LCS								
Lead (Pb)-Total			95.8		%		80-120	16-SEP-18
Lithium (Li)-Total			93.7		%		80-120	16-SEP-18
Magnesium (Mg)-Total			92.8		%		80-120	16-SEP-18
Manganese (Mn)-Total			95.2		%		80-120	16-SEP-18
Molybdenum (Mo)-Total			94.9		%		80-120	16-SEP-18
Nickel (Ni)-Total			93.0		%		80-120	16-SEP-18
Potassium (K)-Total			93.9		%		80-120	16-SEP-18
Selenium (Se)-Total			93.9		%		80-120	16-SEP-18
Silicon (Si)-Total			91.5		%		80-120	16-SEP-18
Silver (Ag)-Total			92.6		%		80-120	16-SEP-18
Sodium (Na)-Total			96.1		%		80-120	16-SEP-18
Strontium (Sr)-Total			95.2		%		80-120	16-SEP-18
Thallium (Tl)-Total			94.7		%		80-120	16-SEP-18
Tin (Sn)-Total			92.6		%		80-120	16-SEP-18
Titanium (Ti)-Total			93.4		%		80-120	16-SEP-18
Uranium (U)-Total			90.6		%		80-120	16-SEP-18
Vanadium (V)-Total			95.9		%		80-120	16-SEP-18
Zinc (Zn)-Total			92.9		%		80-120	16-SEP-18
WG2877584-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	16-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	16-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	16-SEP-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	16-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	16-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	16-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	16-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	16-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	16-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	16-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4217619								
WG2877584-1 MB								
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	16-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	16-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	16-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	16-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	16-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	16-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	16-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	16-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	16-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	16-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	16-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	16-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	16-SEP-18
NH3-L-F-CL	**Water**							
Batch R4216503								
WG2877171-10 LCS								
Ammonia as N			102.9		%		85-115	14-SEP-18
WG2877171-6 LCS								
Ammonia as N			101.2		%		85-115	14-SEP-18
WG2877171-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	14-SEP-18
WG2877171-9 MB								
Ammonia as N			<0.0050		mg/L		0.005	14-SEP-18
NO2-L-IC-N-CL	**Water**							
Batch R4216076								
WG2876717-14 LCS								
Nitrite (as N)			107.0		%		90-110	13-SEP-18
WG2876717-13 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	13-SEP-18
NO3-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4216076								
WG2876717-14 LCS								
Nitrate (as N)			100.8		%		90-110	13-SEP-18
WG2876717-13 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	13-SEP-18
ORP-CL	**Water**							
Batch R4216073								
WG2876110-3 CRM		**CL-ORP**						
ORP			223		mV		210-230	13-SEP-18
Batch R4218827								
WG2878689-6 CRM		**CL-ORP**						
ORP			218		mV		210-230	17-SEP-18
WG2878689-8 CRM		**CL-ORP**						
ORP			218		mV		210-230	17-SEP-18
P-T-L-COL-CL	**Water**							
Batch R4236892								
WG2884824-90 LCS								
Phosphorus (P)-Total			104.7		%		80-120	24-SEP-18
WG2884824-89 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	24-SEP-18
P-T-L-COL-ED	**Water**							
Batch R4217754								
WG2877815-3 DUP		**L2163892-4**						
Phosphorus (P)-Total		0.0040	0.0038		mg/L	5.1	20	17-SEP-18
WG2877815-2 LCS								
Phosphorus (P)-Total			95.4		%		80-120	17-SEP-18
WG2877815-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	17-SEP-18
WG2877815-4 MS		**L2163892-4**						
Phosphorus (P)-Total			99.6		%		70-130	17-SEP-18
PH-CL	**Water**							
Batch R4216390								
WG2876549-38 LCS								
pH			7.00		pH		6.9-7.1	13-SEP-18
PO4-DO-L-COL-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-L-COL-CL	**Water**							
Batch R4216282								
WG2875974-14 LCS								
Orthophosphate-Dissolved (as P)			101.4		%		80-120	13-SEP-18
WG2875974-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	13-SEP-18
SO4-IC-N-CL	**Water**							
Batch R4216076								
WG2876717-14 LCS								
Sulfate (SO4)			102.9		%		90-110	13-SEP-18
WG2876717-13 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	13-SEP-18
SOLIDS-TDS-CL	**Water**							
Batch R4216327								
WG2875458-2 LCS								
Total Dissolved Solids			97.1		%		85-115	13-SEP-18
WG2875458-1 MB								
Total Dissolved Solids			<10		mg/L		10	13-SEP-18
Batch R4226709								
WG2879364-6 DUP		**L2163892-2**						
Total Dissolved Solids		378	369		mg/L	2.4	20	18-SEP-18
WG2879364-5 LCS								
Total Dissolved Solids			103.7		%		85-115	18-SEP-18
WG2879364-4 MB								
Total Dissolved Solids			<10		mg/L		10	18-SEP-18
TKN-L-F-CL	**Water**							
Batch R4216680								
WG2877362-2 LCS								
Total Kjeldahl Nitrogen			118.3		%		75-125	14-SEP-18
WG2877362-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	14-SEP-18
Batch R4217558								
WG2876260-2 LCS								
Total Kjeldahl Nitrogen			120.5		%		75-125	17-SEP-18
WG2876260-22 LCS								
Total Kjeldahl Nitrogen			118.8		%		75-125	17-SEP-18
WG2876260-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	17-SEP-18
WG2876260-21 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	17-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-L-F-CL	**Water**							
Batch R4217558								
WG2878442-12 MS		**L2163892-3**						
Total Kjeldahl Nitrogen			75.4		%		70-130	17-SEP-18
TSS-L-CL	**Water**							
Batch R4216325								
WG2875965-14 LCS								
Total Suspended Solids			101.0		%		85-115	13-SEP-18
WG2875965-13 MB								
Total Suspended Solids			<1.0		mg/L		1	13-SEP-18
Batch R4223790								
WG2879705-8 LCS								
Total Suspended Solids			93.8		%		85-115	18-SEP-18
WG2879705-7 MB								
Total Suspended Solids			<1.0		mg/L		1	18-SEP-18
TURBIDITY-CL	**Water**							
Batch R4216004								
WG2875802-8 LCS								
Turbidity			99.0		%		85-115	13-SEP-18
WG2875802-7 MB								
Turbidity			<0.10		NTU		0.1	13-SEP-18
Batch R4217079								
WG2876766-34 LCS								
Turbidity			97.0		%		85-115	14-SEP-18
WG2876766-35 MB								
Turbidity			<0.10		NTU		0.1	14-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	12-SEP-18 10:45	17-SEP-18 08:20	0.25	118	hours	EHTR-FM
	2	12-SEP-18 00:55	17-SEP-18 08:20	0.25	127	hours	EHTR-FM
	3	12-SEP-18 14:20	17-SEP-18 08:20	0.25	114	hours	EHTR-FM
	4	12-SEP-18 09:40	13-SEP-18 16:08	0.25	30	hours	EHTR-FM
pH							
	1	12-SEP-18 10:45	13-SEP-18 17:00	0.25	30	hours	EHTR-FM
	2	12-SEP-18 00:55	13-SEP-18 17:00	0.25	40	hours	EHTR-FM
	3	12-SEP-18 14:20	13-SEP-18 17:00	0.25	27	hours	EHTR-FM
	4	12-SEP-18 09:40	13-SEP-18 17:00	0.25	31	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2163892 were received on 13-SEP-18 09:50.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: QTR_GW_2018-09-03 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Greenhills Operation			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jeremy Enns			Lab Contact	Lyudmyla Shvets			Email 1:	Jeremy.Enns@teck.com	X	X	X
Email	Jeremy.Enns@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	jennifer.kropp@teck.com	X	X	X
Address	P.O. BOX 5000			Address	2559 29 Street NE			Email 3:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B1H0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada					
Phone Number	250-865-3341			Phone Number	403 407 1794							

SAMPLE DETAILS — ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-ROUTINE-VA	TECKCOAL-MET-T-VA	HG-T-D-CVAF-VA				
	FIELD FILTERED								N	N	N		N	N	N					
	PRESERVATION								NONE	H2SO4	NONE	HCL	NONE	NONE	HNO3					
1	GH_GA-MW-2_WG_2018-07-01_NP	GH_GA-MW-2	WG		Sept. 12	10:45	G	6	1	1	1	1	1	1						
2	GH_GA-MW-3_WG_2018-07-01_NP	GH_GA-MW-3	WG		Sept. 12	12:55	G	6	1	1	1	1	1	1						
3	GH_MW-ERSC-1_WG_2018-07-01_NP	GH_MW-ERSC-1	WG		Sept. 12	14:20	G	6	1	1	1	1	1	1						
4	GH_POTW06_WG_2018-07-01_NP	GH_POTW06	WG				G	7	1	1	1	1	1	1	1					
5	GH_WC1_WS_2018-09-11_N	GH_WC1	WS		Sept. 12	9:40	G	7	1	1	1		1	1	1	1				
	GH-WC1-WS-2018-09-12_FB+TG															1				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
				9/13 950

SERVICE REQUEST (rush - subject to availability)

Regular (default) X	Sampler's Name		Mobile #
Priority (2-3 business days) - 50% surcharge			
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time
For Emergency <1 Day, ASAP or Weekend - Contact ALS			

L2163892-COFC

Teck

COC ID: | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO

Facility Name / Job#	Greenhills Operation
Project Manager	Jeremy Enns
Email	Jeremy.Enns@teck.com
Address	P.O. BOX 5000
City	Elkford
Province	BC
Postal Code	V0B1H0
Country	Canada
Phone Number	250-865-3341

LABORATORY

Lab Name	ALS Calgary
Lab Contact	Lyudmyla Shvets
Email	Lyudmyla.Shvets@ALSGlobal.com
Address	2559 29 Street NE
City	Calgary
Province	AB
Postal Code	T1Y 7B5
Country	Canada
Phone Number	403 407 1794

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Jeremy.Enns@teck.com	X	X	X
Email 2:	[illegible]	X	X	X
Email 3:	teckcoal@equisonline.com	✓		X

PO number: 540380

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys loc code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	HG-T-U-CVAF-VA	ALS_Package-BOD	ALS_Package-Colour/BOD	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA	ALS_Package-TSS/TURB	ALS_Package-EPH	Methyl Hg
FIL								N	N		N	N	N	N	N	N			
PRESERV								none			NONE	H2SO4	NONE	NONE	HNO3	NONE		NAHSO4	HCL
6% GH_FRI_WS_2018-09-12_N	GH_FRI	WS		2018/09/12	17:30	G	2							1	1				
87 GH_ERI_WS_2018-09-12_N	GH_ERI	WS		2018/09/12	14:50	G	2							1	1				
8% GH_ERC_WS_2018-09-12_N	GH_ERC	WS		2018/09/12	13:25	G	2							1	1				
		WS				G													
		WS				G													
		WS				G													
		WS				G													
		WS				G													
		WS				G													
		WS				G													
		WS				G													

L2163892-COFC

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	J. Knapp	2018/09/12		9/13 950

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jenn Knapp	Mobile #	250 423 0826.
Sampler's Signature		Date/Time	

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
BOX 5000
ELKFORD BC V0B1H0

Date Received: 18-SEP-18
Report Date: 23-JAN-19 18:19 (MT)
Version: FINAL REV. 3

Client Phone: 250-865-3305

Certificate of Analysis

Lab Work Order #: L2166053

Project P.O. #: VPO00540380
Job Reference: GREENHILLS OPERATION
C of C Numbers: QTR_GW_2018-09-13
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166053-1 GH_MW-RLP-1D_WG_2018-07-01_NP							
Sampled By: KC on 17-SEP-18 @ 10:07							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	10.0		0.50	mg/L		22-SEP-18	R4234550
Total Kjeldahl Nitrogen	0.197		0.050	mg/L		23-SEP-18	R4234450
Total Organic Carbon	9.48		0.50	mg/L		22-SEP-18	R4234550
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	28-SEP-18	28-SEP-18	R4251153
Dissolved Metals Filtration Location	LAB					28-SEP-18	R4250288
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	20-SEP-18	25-SEP-18	R4238229
Dissolved Mercury Filtration Location	FIELD					20-SEP-18	R4225487
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	LAB					28-SEP-18	R4250288
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	28-SEP-18	28-SEP-18	R4251153
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	28-SEP-18	28-SEP-18	R4251153
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	28-SEP-18	28-SEP-18	R4251153
Barium (Ba)-Dissolved	0.0131		0.00010	mg/L	28-SEP-18	28-SEP-18	R4251153
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	28-SEP-18	28-SEP-18	R4251153
Boron (B)-Dissolved	0.016		0.010	mg/L	28-SEP-18	28-SEP-18	R4251153
Cadmium (Cd)-Dissolved	<0.0050		0.0050	ug/L	28-SEP-18	28-SEP-18	R4251153
Calcium (Ca)-Dissolved	21.2		0.050	mg/L	28-SEP-18	28-SEP-18	R4251153
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	28-SEP-18	28-SEP-18	R4251153
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	28-SEP-18	28-SEP-18	R4251153
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	28-SEP-18	28-SEP-18	R4251153
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	28-SEP-18	28-SEP-18	R4251153
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	28-SEP-18	28-SEP-18	R4251153
Lithium (Li)-Dissolved	0.0075		0.0010	mg/L	28-SEP-18	28-SEP-18	R4251153
Magnesium (Mg)-Dissolved	26.0		0.10	mg/L	28-SEP-18	28-SEP-18	R4251153
Manganese (Mn)-Dissolved	0.00824		0.00010	mg/L	28-SEP-18	28-SEP-18	R4251153
Molybdenum (Mo)-Dissolved	0.000424		0.000050	mg/L	28-SEP-18	28-SEP-18	R4251153
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	28-SEP-18	28-SEP-18	R4251153
Potassium (K)-Dissolved	1.33		0.050	mg/L	28-SEP-18	28-SEP-18	R4251153
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	28-SEP-18	28-SEP-18	R4251153
Silicon (Si)-Dissolved	1.11		0.050	mg/L	28-SEP-18	28-SEP-18	R4251153
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	28-SEP-18	28-SEP-18	R4251153
Sodium (Na)-Dissolved	4.40		0.050	mg/L	28-SEP-18	28-SEP-18	R4251153
Strontium (Sr)-Dissolved	0.122		0.00020	mg/L	28-SEP-18	28-SEP-18	R4251153
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	28-SEP-18	28-SEP-18	R4251153
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	28-SEP-18	28-SEP-18	R4251153
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	28-SEP-18	28-SEP-18	R4251153
Uranium (U)-Dissolved	<0.000010		0.000010	mg/L	28-SEP-18	28-SEP-18	R4251153
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	28-SEP-18	28-SEP-18	R4251153
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	28-SEP-18	28-SEP-18	R4251153
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	160		0.50	mg/L		28-SEP-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		21-SEP-18	R4231871
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		22-SEP-18	R4233249
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		21-SEP-18	R4231871
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		21-SEP-18	R4231871

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166053-1 GH_MW-RLP-1D_WG_2018-07-01_NP							
Sampled By: KC on 17-SEP-18 @ 10:07							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Arsenic (As)-Total	<0.00010		0.00010	mg/L		21-SEP-18	R4231871
Barium (Ba)-Total	0.0134		0.00010	mg/L		21-SEP-18	R4231871
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		21-SEP-18	R4231871
Boron (B)-Total	0.016		0.010	mg/L		21-SEP-18	R4231871
Cadmium (Cd)-Total	<0.0050		0.0050	ug/L		21-SEP-18	R4231871
Calcium (Ca)-Total	20.7		0.050	mg/L		21-SEP-18	R4231871
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		21-SEP-18	R4231871
Cobalt (Co)-Total	<0.10		0.10	ug/L		21-SEP-18	R4231871
Copper (Cu)-Total	<0.00050		0.00050	mg/L		21-SEP-18	R4231871
Iron (Fe)-Total	<0.010		0.010	mg/L		21-SEP-18	R4231871
Lead (Pb)-Total	<0.000050		0.000050	mg/L		21-SEP-18	R4231871
Lithium (Li)-Total	0.0075		0.0010	mg/L		21-SEP-18	R4231871
Magnesium (Mg)-Total	29.1		0.10	mg/L		21-SEP-18	R4231871
Manganese (Mn)-Total	0.0167		0.00010	mg/L		21-SEP-18	R4231871
Molybdenum (Mo)-Total	0.000491		0.000050	mg/L		21-SEP-18	R4231871
Nickel (Ni)-Total	<0.00050		0.00050	mg/L		21-SEP-18	R4231871
Potassium (K)-Total	1.45		0.050	mg/L		21-SEP-18	R4231871
Selenium (Se)-Total	<0.050		0.050	ug/L		21-SEP-18	R4231871
Silicon (Si)-Total	1.17		0.10	mg/L		21-SEP-18	R4231871
Silver (Ag)-Total	<0.000010		0.000010	mg/L		21-SEP-18	R4231871
Sodium (Na)-Total	5.00		0.050	mg/L		21-SEP-18	R4231871
Strontium (Sr)-Total	0.117		0.00020	mg/L		21-SEP-18	R4231871
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		21-SEP-18	R4231871
Tin (Sn)-Total	<0.00010		0.00010	mg/L		21-SEP-18	R4231871
Titanium (Ti)-Total	<0.010		0.010	mg/L		21-SEP-18	R4231871
Uranium (U)-Total	<0.000010		0.000010	mg/L		21-SEP-18	R4231871
Vanadium (V)-Total	<0.00050		0.00050	mg/L		21-SEP-18	R4231871
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		21-SEP-18	R4231871
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<2.0		2.0	mg/L		23-SEP-18	R4237069
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	179		1.0	mg/L		25-SEP-18	R4243953
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		25-SEP-18	R4243953
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		25-SEP-18	R4243953
Alkalinity, Total (as CaCO3)	179		1.0	mg/L		25-SEP-18	R4243953
Ammonia, Total (as N)							
Ammonia as N	0.0122		0.0050	mg/L		26-SEP-18	R4244007
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		18-SEP-18	R4224507
Chloride in Water by IC							
Chloride (Cl)	0.73		0.50	mg/L		18-SEP-18	R4224507
Electrical Conductivity (EC)							
Conductivity (@ 25C)	316		2.0	uS/cm		25-SEP-18	R4243953
Fluoride in Water by IC							
Fluoride (F)	1.61		0.020	mg/L		18-SEP-18	R4224507
Ion Balance Calculation							
Ion Balance	92.8		-100	%		28-SEP-18	
Ion Balance Calculation							
Cation - Anion Balance	-3.7			%		28-SEP-18	
Anion Sum	3.68			meq/L		28-SEP-18	
Cation Sum	3.42			meq/L		28-SEP-18	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166053-1 GH_MW-RLP-1D_WG_2018-07-01_NP							
Sampled By: KC on 17-SEP-18 @ 10:07							
Matrix: WG							
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	<0.0050		0.0050	mg/L		18-SEP-18	R4224507
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0010		0.0010	mg/L		18-SEP-18	R4224507
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		18-SEP-18	R4230728
Oxidation redution potential by elect.							
ORP	263		-1000	mV		19-SEP-18	R4228571
Phosphorus (P)-Total							
Phosphorus (P)-Total	0.0097		0.0020	mg/L		26-SEP-18	R4245954
Sulfate in Water by IC							
Sulfate (SO4)	<0.30		0.30	mg/L		18-SEP-18	R4224507
Total Dissolved Solids							
Total Dissolved Solids	155	DLHC	20	mg/L		21-SEP-18	R4235508
Total Suspended Solids							
Total Suspended Solids	17.1		1.0	mg/L		21-SEP-18	R4235889
Turbidity							
Turbidity	20.6		0.10	NTU		18-SEP-18	R4223488
pH							
pH	8.72		0.10	pH		25-SEP-18	R4243953
L2166053-2 GH_POTW09_WG_2018-07-01_NP							
Sampled By: KC on 17-SEP-18 @ 10:39							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	<0.50		0.50	mg/L		23-SEP-18	R4235331
Total Kjeldahl Nitrogen	0.085		0.050	mg/L		23-SEP-18	R4234450
Total Organic Carbon	<0.50		0.50	mg/L		23-SEP-18	R4235331
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	28-SEP-18	28-SEP-18	R4251400
Dissolved Metals Filtration Location	LAB					28-SEP-18	R4250288
Dissolved Metals Filtration Location	LAB					28-SEP-18	R4251301
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	20-SEP-18	25-SEP-18	R4238229
Dissolved Mercury Filtration Location	FIELD					20-SEP-18	R4225487
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	LAB					28-SEP-18	R4251301
Dissolved Metals Filtration Location	LAB					28-SEP-18	R4250288
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	28-SEP-18	28-SEP-18	R4251400
Antimony (Sb)-Dissolved	0.00081	DTC	0.00010	mg/L	28-SEP-18	28-SEP-18	R4251400
Arsenic (As)-Dissolved	0.00024		0.00010	mg/L	28-SEP-18	28-SEP-18	R4251400
Barium (Ba)-Dissolved	0.0390		0.00010	mg/L	28-SEP-18	28-SEP-18	R4251400
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	28-SEP-18	28-SEP-18	R4251400
Boron (B)-Dissolved	0.011		0.010	mg/L	28-SEP-18	28-SEP-18	R4251400
Cadmium (Cd)-Dissolved	0.0074		0.0050	ug/L	28-SEP-18	28-SEP-18	R4251400
Calcium (Ca)-Dissolved	162	DTC	0.050	mg/L	28-SEP-18	28-SEP-18	R4251400
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	28-SEP-18	28-SEP-18	R4251400
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	28-SEP-18	28-SEP-18	R4251400
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	28-SEP-18	28-SEP-18	R4251400
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	28-SEP-18	28-SEP-18	R4251400
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	28-SEP-18	28-SEP-18	R4251400
Lithium (Li)-Dissolved	0.0194	DTC	0.0010	mg/L	28-SEP-18	28-SEP-18	R4251400

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166053-2 GH_POTW09_WG_2018-07-01_NP							
Sampled By: KC on 17-SEP-18 @ 10:39							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Magnesium (Mg)-Dissolved	169	DTC	0.10	mg/L	28-SEP-18	28-SEP-18	R4251400
Manganese (Mn)-Dissolved	0.00026		0.00010	mg/L	28-SEP-18	28-SEP-18	R4251400
Molybdenum (Mo)-Dissolved	0.00300		0.000050	mg/L	28-SEP-18	28-SEP-18	R4251400
Nickel (Ni)-Dissolved	0.0174	DTC	0.00050	mg/L	28-SEP-18	28-SEP-18	R4251400
Potassium (K)-Dissolved	2.56	DTC	0.050	mg/L	28-SEP-18	28-SEP-18	R4251400
Selenium (Se)-Dissolved	185	DTC	0.050	ug/L	28-SEP-18	28-SEP-18	R4251400
Silicon (Si)-Dissolved	2.76		0.050	mg/L	28-SEP-18	28-SEP-18	R4251400
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	28-SEP-18	28-SEP-18	R4251400
Sodium (Na)-Dissolved	2.74		0.050	mg/L	28-SEP-18	28-SEP-18	R4251400
Strontium (Sr)-Dissolved	0.181		0.00020	mg/L	28-SEP-18	28-SEP-18	R4251400
Thallium (Tl)-Dissolved	0.000010		0.000010	mg/L	28-SEP-18	28-SEP-18	R4251400
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	28-SEP-18	28-SEP-18	R4251400
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	28-SEP-18	28-SEP-18	R4251400
Uranium (U)-Dissolved	0.00776	DTC	0.000010	mg/L	28-SEP-18	28-SEP-18	R4251400
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	28-SEP-18	28-SEP-18	R4251400
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	28-SEP-18	28-SEP-18	R4251400
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	1100		0.50	mg/L		30-SEP-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		28-SEP-18	R4251540
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		22-SEP-18	R4233249
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		28-SEP-18	R4251540
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		28-SEP-18	R4251540
Arsenic (As)-Total	0.00048		0.00010	mg/L		28-SEP-18	R4251540
Barium (Ba)-Total	0.0345		0.00010	mg/L		28-SEP-18	R4251540
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		28-SEP-18	R4251540
Boron (B)-Total	0.020		0.010	mg/L		28-SEP-18	R4251540
Cadmium (Cd)-Total	0.0089		0.0050	ug/L		28-SEP-18	R4251540
Calcium (Ca)-Total	94.1		0.050	mg/L		28-SEP-18	R4251540
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		28-SEP-18	R4251540
Cobalt (Co)-Total	0.17		0.10	ug/L		28-SEP-18	R4251540
Copper (Cu)-Total	0.00271		0.00050	mg/L		28-SEP-18	R4251540
Iron (Fe)-Total	0.151		0.010	mg/L		28-SEP-18	R4251540
Lead (Pb)-Total	<0.000050		0.000050	mg/L		28-SEP-18	R4251540
Lithium (Li)-Total	0.0112		0.0010	mg/L		28-SEP-18	R4251540
Magnesium (Mg)-Total	39.4		0.10	mg/L		28-SEP-18	R4251540
Manganese (Mn)-Total	0.191		0.00010	mg/L		28-SEP-18	R4251540
Molybdenum (Mo)-Total	0.00273		0.000050	mg/L		28-SEP-18	R4251540
Nickel (Ni)-Total	0.00207		0.00050	mg/L		28-SEP-18	R4251540
Potassium (K)-Total	1.56		0.050	mg/L		28-SEP-18	R4251540
Selenium (Se)-Total	0.978		0.050	ug/L		28-SEP-18	R4251540
Silicon (Si)-Total	4.70		0.10	mg/L		28-SEP-18	R4251540
Silver (Ag)-Total	<0.000010		0.000010	mg/L		28-SEP-18	R4251540
Sodium (Na)-Total	6.56		0.050	mg/L		28-SEP-18	R4251540
Strontium (Sr)-Total	0.342		0.00020	mg/L		28-SEP-18	R4251540
Thallium (Tl)-Total	0.000017		0.000010	mg/L		28-SEP-18	R4251540
Tin (Sn)-Total	<0.00010		0.00010	mg/L		28-SEP-18	R4251540
Titanium (Ti)-Total	<0.010		0.010	mg/L		28-SEP-18	R4251540
Uranium (U)-Total	0.00211		0.000010	mg/L		28-SEP-18	R4251540

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166053-2 GH_POTW09_WG_2018-07-01_NP							
Sampled By: KC on 17-SEP-18 @ 10:39							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Vanadium (V)-Total	<0.00050		0.00050	mg/L		28-SEP-18	R4251540
Zinc (Zn)-Total	0.0074		0.0030	mg/L		28-SEP-18	R4251540
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<2.0		2.0	mg/L		23-SEP-18	R4237069
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	217		1.0	mg/L		25-SEP-18	R4243953
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		25-SEP-18	R4243953
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		25-SEP-18	R4243953
Alkalinity, Total (as CaCO3)	217		1.0	mg/L		25-SEP-18	R4243953
Ammonia, Total (as N)							
Ammonia as N	0.0475		0.0050	mg/L		26-SEP-18	R4244007
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		18-SEP-18	R4224507
Chloride in Water by IC							
Chloride (Cl)	6.47		0.50	mg/L		18-SEP-18	R4224507
Electrical Conductivity (EC)							
Conductivity (@ 25C)	723		2.0	uS/cm		25-SEP-18	R4243953
Fluoride in Water by IC							
Fluoride (F)	0.778		0.020	mg/L		18-SEP-18	R4224507
Ion Balance Calculation							
Ion Balance	278	RRV	-100	%		01-OCT-18	
Ion Balance Calculation							
Cation - Anion Balance	47.1			%		30-SEP-18	
Anion Sum	7.99			meq/L		30-SEP-18	
Cation Sum	22.2			meq/L		30-SEP-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.0135		0.0050	mg/L		18-SEP-18	R4224507
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0010		0.0010	mg/L		18-SEP-18	R4224507
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		18-SEP-18	R4230728
Oxidation redution potential by elect.							
ORP	271		-1000	mV		19-SEP-18	R4228571
Phosphorus (P)-Total							
Phosphorus (P)-Total	0.0029		0.0020	mg/L		26-SEP-18	R4245954
Sulfate in Water by IC							
Sulfate (SO4)	165		0.30	mg/L		18-SEP-18	R4224507
Total Dissolved Solids							
Total Dissolved Solids	476	DLHC	20	mg/L		21-SEP-18	R4235508
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		21-SEP-18	R4235889
Turbidity							
Turbidity	1.02		0.10	NTU		18-SEP-18	R4223488
pH							
pH	8.43		0.10	pH		25-SEP-18	R4243953
L2166053-3 GH_SITE-C_WEIR_WS_2018-09-03_FB-HG-NP							
Sampled By: KC on 17-SEP-18 @ 13:38							
Matrix: WS							
Miscellaneous Parameters							
Mercury (Hg)-Total	<0.00050		0.00050	ug/L		21-SEP-18	R4232461

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166053-4 GH_SITE-C_WEIR_WS_2018-09-03_NP-NP							
Sampled By: KC on 17-SEP-18 @ 13:38							
Matrix: WS							
Miscellaneous Parameters							
Dissolved Organic Carbon	1.48		0.50	mg/L		23-SEP-18	R4235331
Total Kjeldahl Nitrogen	0.209		0.050	mg/L		23-SEP-18	R4234450
Mercury (Hg)-Total	<0.00050		0.00050	ug/L		21-SEP-18	R4232461
Total Organic Carbon	1.37		0.50	mg/L		23-SEP-18	R4235331
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.040	DLA	0.040	ug/L	20-SEP-18	20-SEP-18	R4229282
Dissolved Metals Filtration Location	LAB					20-SEP-18	R4226516
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	20-SEP-18	20-SEP-18	R4225801
Dissolved Mercury Filtration Location	LAB					20-SEP-18	R4225715
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	LAB					20-SEP-18	R4226516
Dissolved Metals Filtration Location	LAB					21-SEP-18	R4232528
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	20-SEP-18	20-SEP-18	R4229282
Antimony (Sb)-Dissolved	<0.00020	DLA	0.00020	mg/L	20-SEP-18	20-SEP-18	R4229282
Arsenic (As)-Dissolved	<0.00020	DLA	0.00020	mg/L	20-SEP-18	20-SEP-18	R4229282
Barium (Ba)-Dissolved	0.0233		0.00020	mg/L	20-SEP-18	20-SEP-18	R4229282
Bismuth (Bi)-Dissolved	<0.00010	DLA	0.00010	mg/L	20-SEP-18	20-SEP-18	R4229282
Boron (B)-Dissolved	<0.020	DLA	0.020	mg/L	20-SEP-18	20-SEP-18	R4229282
Cadmium (Cd)-Dissolved	0.044		0.010	ug/L	20-SEP-18	20-SEP-18	R4229282
Calcium (Ca)-Dissolved	199		0.10	mg/L	20-SEP-18	20-SEP-18	R4229282
Chromium (Cr)-Dissolved	<0.00020	DLA	0.00020	mg/L	20-SEP-18	20-SEP-18	R4229282
Cobalt (Co)-Dissolved	1.59		0.20	ug/L	20-SEP-18	20-SEP-18	R4229282
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	20-SEP-18	20-SEP-18	R4229282
Iron (Fe)-Dissolved	<0.020	DLA	0.020	mg/L	20-SEP-18	20-SEP-18	R4229282
Lead (Pb)-Dissolved	<0.00010	DLA	0.00010	mg/L	20-SEP-18	20-SEP-18	R4229282
Lithium (Li)-Dissolved	0.0235		0.0020	mg/L	20-SEP-18	20-SEP-18	R4229282
Magnesium (Mg)-Dissolved	117		0.10	mg/L	20-SEP-18	20-SEP-18	R4229282
Manganese (Mn)-Dissolved	0.469		0.00020	mg/L	20-SEP-18	20-SEP-18	R4229282
Molybdenum (Mo)-Dissolved	0.00169		0.00010	mg/L	20-SEP-18	20-SEP-18	R4229282
Nickel (Ni)-Dissolved	0.0060		0.0010	mg/L	20-SEP-18	20-SEP-18	R4229282
Potassium (K)-Dissolved	3.09		0.10	mg/L	20-SEP-18	20-SEP-18	R4229282
Selenium (Se)-Dissolved	0.49		0.10	ug/L	21-SEP-18	21-SEP-18	R4233007
Silicon (Si)-Dissolved	3.35		0.10	mg/L	20-SEP-18	20-SEP-18	R4229282
Silver (Ag)-Dissolved	<0.000020	DLA	0.000020	mg/L	20-SEP-18	20-SEP-18	R4229282
Sodium (Na)-Dissolved	16.6		0.10	mg/L	20-SEP-18	20-SEP-18	R4229282
Strontium (Sr)-Dissolved	0.243		0.00040	mg/L	20-SEP-18	20-SEP-18	R4229282
Thallium (Tl)-Dissolved	<0.000020	DLA	0.000020	mg/L	20-SEP-18	20-SEP-18	R4229282
Tin (Sn)-Dissolved	<0.00020	DLA	0.00020	mg/L	20-SEP-18	20-SEP-18	R4229282
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	20-SEP-18	20-SEP-18	R4229282
Uranium (U)-Dissolved	0.00376		0.000020	mg/L	20-SEP-18	20-SEP-18	R4229282
Vanadium (V)-Dissolved	<0.0010	DLA	0.0010	mg/L	20-SEP-18	20-SEP-18	R4229282
Zinc (Zn)-Dissolved	<0.0020	DLA	0.0020	mg/L	20-SEP-18	20-SEP-18	R4229282
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	978		0.50	mg/L		24-SEP-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		21-SEP-18	R4231871
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0143		0.0030	mg/L		21-SEP-18	R4231871

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166053-4 GH_SITE-C_WEIR_WS_2018-09-03_NP-NP							
Sampled By: KC on 17-SEP-18 @ 13:38							
Matrix: WS							
Total Metals in Water by CRC ICPMS							
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		21-SEP-18	R4231871
Arsenic (As)-Total	0.00033		0.00010	mg/L		21-SEP-18	R4231871
Barium (Ba)-Total	0.0246		0.00010	mg/L		21-SEP-18	R4231871
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		21-SEP-18	R4231871
Boron (B)-Total	0.020		0.010	mg/L		21-SEP-18	R4231871
Cadmium (Cd)-Total	0.0643		0.0050	ug/L		21-SEP-18	R4231871
Calcium (Ca)-Total	221		0.050	mg/L		21-SEP-18	R4231871
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		21-SEP-18	R4231871
Cobalt (Co)-Total	1.77		0.10	ug/L		21-SEP-18	R4231871
Copper (Cu)-Total	<0.00050		0.00050	mg/L		21-SEP-18	R4231871
Iron (Fe)-Total	1.77		0.010	mg/L		21-SEP-18	R4231871
Lead (Pb)-Total	<0.000050		0.000050	mg/L		21-SEP-18	R4231871
Lithium (Li)-Total	0.0281		0.0010	mg/L		21-SEP-18	R4231871
Magnesium (Mg)-Total	124		0.10	mg/L		21-SEP-18	R4231871
Manganese (Mn)-Total	0.548		0.00010	mg/L		21-SEP-18	R4231871
Molybdenum (Mo)-Total	0.00194		0.000050	mg/L		21-SEP-18	R4231871
Nickel (Ni)-Total	0.00660		0.00050	mg/L		21-SEP-18	R4231871
Potassium (K)-Total	3.17		0.050	mg/L		21-SEP-18	R4231871
Selenium (Se)-Total	0.475		0.050	ug/L		21-SEP-18	R4231871
Silicon (Si)-Total	3.46		0.10	mg/L		21-SEP-18	R4231871
Silver (Ag)-Total	<0.000010		0.000010	mg/L		21-SEP-18	R4231871
Sodium (Na)-Total	17.0		0.050	mg/L		21-SEP-18	R4231871
Strontium (Sr)-Total	0.275		0.00020	mg/L		21-SEP-18	R4231871
Thallium (Tl)-Total	0.000020		0.000010	mg/L		21-SEP-18	R4231871
Tin (Sn)-Total	<0.00010		0.00010	mg/L		21-SEP-18	R4231871
Titanium (Ti)-Total	<0.010		0.010	mg/L		21-SEP-18	R4231871
Uranium (U)-Total	0.00397		0.000010	mg/L		21-SEP-18	R4231871
Vanadium (V)-Total	<0.00050		0.00050	mg/L		21-SEP-18	R4231871
Zinc (Zn)-Total	0.0045		0.0030	mg/L		21-SEP-18	R4231871
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	5.6		2.0	mg/L		23-SEP-18	R4237069
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	284		1.0	mg/L		25-SEP-18	R4243953
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		25-SEP-18	R4243953
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		25-SEP-18	R4243953
Alkalinity, Total (as CaCO3)	284		1.0	mg/L		25-SEP-18	R4243953
Ammonia, Total (as N)							
Ammonia as N	0.120		0.0050	mg/L		26-SEP-18	R4244007
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLDS	0.25	mg/L		18-SEP-18	R4224507
Chloride in Water by IC							
Chloride (Cl)	37.5	DLDS	2.5	mg/L		18-SEP-18	R4224507
Electrical Conductivity (EC)							
Conductivity (@ 25C)	1420		2.0	uS/cm		25-SEP-18	R4243953
Fluoride in Water by IC							
Fluoride (F)	0.41	DLDS	0.10	mg/L		18-SEP-18	R4224507
Ion Balance Calculation							
Ion Balance	116		-100	%		26-SEP-18	
Ion Balance Calculation							
Cation - Anion Balance	7.4			%		26-SEP-18	
Anion Sum	17.6			meq/L		26-SEP-18	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166053-4 GH_SITE-C_WEIR_WS_2018-09-03_NP-NP							
Sampled By: KC on 17-SEP-18 @ 13:38							
Matrix: WS							
Ion Balance Calculation							
Cation Sum	20.4			meq/L		26-SEP-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.040	DLDS	0.025	mg/L		18-SEP-18	R4224507
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.0050	DLDS	0.0050	mg/L		18-SEP-18	R4224507
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		18-SEP-18	R4230728
Oxidation redution potential by elect.							
ORP	305		-1000	mV		19-SEP-18	R4228571
Phosphorus (P)-Total							
Phosphorus (P)-Total	<0.0020		0.0020	mg/L		26-SEP-18	R4245954
Sulfate in Water by IC							
Sulfate (SO4)	519	DLDS	1.5	mg/L		18-SEP-18	R4224507
Total Dissolved Solids							
Total Dissolved Solids	1250	DLHC	20	mg/L		21-SEP-18	R4235508
Total Suspended Solids							
Total Suspended Solids	5.4		1.0	mg/L		21-SEP-18	R4235889
Turbidity							
Turbidity	8.43		0.10	NTU		18-SEP-18	R4223488
pH							
pH	8.25		0.10	pH		25-SEP-18	R4243953

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	DOC, DIS METALS TO BE LAB FILTERED/PRESERVED - Sample was Filtered and Preserved at the laboratory

Sample Parameter Qualifier Key:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA	Water	Total Mercury in Water by CVAFS (Ultra)	EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

QTR_GW_2018-09-13

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TECK COAL LIMITED (GREENHILLS)
BOX 5000
ELKFORD BC V0B1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4237069								
WG2885269-5 LCS								
Acidity (as CaCO3)			114.9		%		85-115	23-SEP-18
WG2885269-4 MB								
Acidity (as CaCO3)			<2.0		mg/L		4	23-SEP-18
ALK-MAN-CL	**Water**							
Batch R4243953								
WG2887053-8 LCS								
Alkalinity, Total (as CaCO3)			110.4		%		85-115	25-SEP-18
WG2887053-7 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	25-SEP-18
BE-D-L-CCMS-VA	**Water**							
Batch R4229282								
WG2881660-2 LCS								
Beryllium (Be)-Dissolved			96.6		%		80-120	20-SEP-18
WG2881660-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	20-SEP-18
Batch R4251153								
WG2889754-2 LCS								
Beryllium (Be)-Dissolved			94.8		%		80-120	28-SEP-18
WG2889754-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	28-SEP-18
WG2889754-4 MS		**L2166053-1**						
Beryllium (Be)-Dissolved			97.3		%		70-130	28-SEP-18
Batch R4251400								
WG2890179-3 DUP		**L2166053-2**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	28-SEP-18
WG2890179-2 LCS								
Beryllium (Be)-Dissolved			96.3		%		80-120	28-SEP-18
WG2890179-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	28-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4231871								
WG2881405-2 LCS								
Beryllium (Be)-Total			103.6		%		80-120	21-SEP-18
WG2881405-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	21-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BE-T-L-CCMS-VA	**Water**							
Batch R4251540								
WG2890212-2 LCS								
Beryllium (Be)-Total			100.9		%		80-120	28-SEP-18
WG2890212-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	28-SEP-18
WG2890212-4 MS		**L2166053-2**						
Beryllium (Be)-Total			96.1		%		70-130	28-SEP-18
BR-L-IC-N-CL	**Water**							
Batch R4224507								
WG2880947-14 LCS								
Bromide (Br)			91.3		%		85-115	18-SEP-18
WG2880947-13 MB								
Bromide (Br)			<0.050		mg/L		0.05	18-SEP-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4234550								
WG2884477-2 LCS								
Dissolved Organic Carbon			105.9		%		80-120	22-SEP-18
WG2884477-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	22-SEP-18
Batch R4235331								
WG2884779-2 LCS								
Dissolved Organic Carbon			93.1		%		80-120	23-SEP-18
WG2884779-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	23-SEP-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4234550								
WG2884477-2 LCS								
Total Organic Carbon			109.1		%		80-120	22-SEP-18
WG2884477-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	22-SEP-18
Batch R4235331								
WG2884779-2 LCS								
Total Organic Carbon			94.1		%		80-120	23-SEP-18
WG2884779-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-SEP-18
CL-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-CL	**Water**							
Batch R4224507								
WG2880947-14 LCS								
Chloride (Cl)			99.9		%		90-110	18-SEP-18
WG2880947-13 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-SEP-18
EC-L-PCT-CL	**Water**							
Batch R4243953								
WG2887053-8 LCS								
Conductivity (@ 25C)			100.7		%		90-110	25-SEP-18
WG2887053-7 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	25-SEP-18
F-IC-N-CL	**Water**							
Batch R4224507								
WG2880947-14 LCS								
Fluoride (F)			106.7		%		90-110	18-SEP-18
WG2880947-13 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4225801								
WG2881390-10 LCS								
Mercury (Hg)-Dissolved			99.7		%		80-120	20-SEP-18
WG2881409-2 LCS								
Mercury (Hg)-Dissolved			99.7		%		80-120	20-SEP-18
WG2881390-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	20-SEP-18
WG2881409-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	20-SEP-18
HG-T-CVAA-VA	**Water**							
Batch R4233249								
WG2883869-7 DUP		**L2166053-2**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	22-SEP-18
WG2883869-2 LCS								
Mercury (Hg)-Total			100.7		%		80-120	22-SEP-18
WG2883869-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	22-SEP-18
HG-T-U-CVAF-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-U-CVAF-VA	**Water**							
Batch R4232461								
WG2883167-2 LCS								
Mercury (Hg)-Total			94.3		%		80-120	21-SEP-18
WG2883167-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	21-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4229282								
WG2881660-2 LCS								
Aluminum (Al)-Dissolved			98.6		%		80-120	20-SEP-18
Antimony (Sb)-Dissolved			103.6		%		80-120	20-SEP-18
Arsenic (As)-Dissolved			98.3		%		80-120	20-SEP-18
Barium (Ba)-Dissolved			95.8		%		80-120	20-SEP-18
Bismuth (Bi)-Dissolved			101.9		%		80-120	20-SEP-18
Boron (B)-Dissolved			91.9		%		80-120	20-SEP-18
Cadmium (Cd)-Dissolved			96.8		%		80-120	20-SEP-18
Calcium (Ca)-Dissolved			94.3		%		80-120	20-SEP-18
Chromium (Cr)-Dissolved			100.5		%		80-120	20-SEP-18
Cobalt (Co)-Dissolved			96.0		%		80-120	20-SEP-18
Copper (Cu)-Dissolved			93.8		%		80-120	20-SEP-18
Iron (Fe)-Dissolved			97.1		%		80-120	20-SEP-18
Lead (Pb)-Dissolved			101.9		%		80-120	20-SEP-18
Lithium (Li)-Dissolved			94.0		%		80-120	20-SEP-18
Magnesium (Mg)-Dissolved			96.5		%		80-120	20-SEP-18
Manganese (Mn)-Dissolved			97.9		%		80-120	20-SEP-18
Molybdenum (Mo)-Dissolved			92.0		%		80-120	20-SEP-18
Nickel (Ni)-Dissolved			95.7		%		80-120	20-SEP-18
Potassium (K)-Dissolved			99.8		%		80-120	20-SEP-18
Silicon (Si)-Dissolved			102.4		%		60-140	20-SEP-18
Silver (Ag)-Dissolved			99.9		%		80-120	20-SEP-18
Sodium (Na)-Dissolved			103.6		%		80-120	20-SEP-18
Strontium (Sr)-Dissolved			98.8		%		80-120	20-SEP-18
Thallium (Tl)-Dissolved			102.3		%		80-120	20-SEP-18
Tin (Sn)-Dissolved			98.8		%		80-120	20-SEP-18
Titanium (Ti)-Dissolved			92.9		%		80-120	20-SEP-18
Uranium (U)-Dissolved			96.6		%		80-120	20-SEP-18
Vanadium (V)-Dissolved			99.9		%		80-120	20-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4229282								
WG2881660-2 LCS								
Zinc (Zn)-Dissolved			98.6		%		80-120	20-SEP-18
WG2881660-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	20-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	20-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	20-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	20-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	20-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	20-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	20-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	20-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	20-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	20-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	20-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	20-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	20-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	20-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	20-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	20-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	20-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	20-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	20-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	20-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	20-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	20-SEP-18
Batch R4233007								
WG2883617-2 LCS								
Aluminum (Al)-Dissolved			104.5		%		80-120	21-SEP-18
Antimony (Sb)-Dissolved			99.7		%		80-120	21-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4233007								
WG2883617-2 LCS								
Arsenic (As)-Dissolved			105.1		%		80-120	21-SEP-18
Barium (Ba)-Dissolved			100.8		%		80-120	21-SEP-18
Bismuth (Bi)-Dissolved			96.2		%		80-120	21-SEP-18
Boron (B)-Dissolved			92.3		%		80-120	21-SEP-18
Cadmium (Cd)-Dissolved			105.9		%		80-120	21-SEP-18
Calcium (Ca)-Dissolved			99.6		%		80-120	21-SEP-18
Chromium (Cr)-Dissolved			102.4		%		80-120	21-SEP-18
Cobalt (Co)-Dissolved			102.4		%		80-120	21-SEP-18
Copper (Cu)-Dissolved			101.0		%		80-120	21-SEP-18
Iron (Fe)-Dissolved			96.0		%		80-120	21-SEP-18
Lead (Pb)-Dissolved			94.9		%		80-120	21-SEP-18
Lithium (Li)-Dissolved			97.2		%		80-120	21-SEP-18
Magnesium (Mg)-Dissolved			104.8		%		80-120	21-SEP-18
Manganese (Mn)-Dissolved			105.0		%		80-120	21-SEP-18
Molybdenum (Mo)-Dissolved			101.2		%		80-120	21-SEP-18
Nickel (Ni)-Dissolved			102.6		%		80-120	21-SEP-18
Potassium (K)-Dissolved			102.4		%		80-120	21-SEP-18
Selenium (Se)-Dissolved			102.2		%		80-120	21-SEP-18
Silicon (Si)-Dissolved			101.1		%		60-140	21-SEP-18
Silver (Ag)-Dissolved			95.9		%		80-120	21-SEP-18
Sodium (Na)-Dissolved			103.2		%		80-120	21-SEP-18
Strontium (Sr)-Dissolved			96.3		%		80-120	21-SEP-18
Thallium (Tl)-Dissolved			97.5		%		80-120	21-SEP-18
Tin (Sn)-Dissolved			99.1		%		80-120	21-SEP-18
Titanium (Ti)-Dissolved			106.7		%		80-120	21-SEP-18
Uranium (U)-Dissolved			94.1		%		80-120	21-SEP-18
Vanadium (V)-Dissolved			106.1		%		80-120	21-SEP-18
Zinc (Zn)-Dissolved			104.1		%		80-120	21-SEP-18
WG2883617-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	21-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	21-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4233007								
WG2883617-1 MB		**LF**						
Boron (B)-Dissolved			<0.010		mg/L		0.01	21-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	21-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	21-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	21-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	21-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	21-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	21-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	21-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	21-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	21-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	21-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	21-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	21-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	21-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	21-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	21-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	21-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	21-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	21-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	21-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	21-SEP-18
Batch R4251153								
WG2889754-2 LCS								
Aluminum (Al)-Dissolved			96.4		%		80-120	28-SEP-18
Antimony (Sb)-Dissolved			99.5		%		80-120	28-SEP-18
Arsenic (As)-Dissolved			100.9		%		80-120	28-SEP-18
Barium (Ba)-Dissolved			101.8		%		80-120	28-SEP-18
Bismuth (Bi)-Dissolved			97.3		%		80-120	28-SEP-18
Boron (B)-Dissolved			94.7		%		80-120	28-SEP-18
Cadmium (Cd)-Dissolved			97.4		%		80-120	28-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4251153								
WG2889754-2 LCS								
Calcium (Ca)-Dissolved			98.3		%		80-120	28-SEP-18
Chromium (Cr)-Dissolved			96.8		%		80-120	28-SEP-18
Cobalt (Co)-Dissolved			95.7		%		80-120	28-SEP-18
Copper (Cu)-Dissolved			96.9		%		80-120	28-SEP-18
Iron (Fe)-Dissolved			98.8		%		80-120	28-SEP-18
Lead (Pb)-Dissolved			99.7		%		80-120	28-SEP-18
Lithium (Li)-Dissolved			96.1		%		80-120	28-SEP-18
Magnesium (Mg)-Dissolved			91.8		%		80-120	28-SEP-18
Manganese (Mn)-Dissolved			97.1		%		80-120	28-SEP-18
Molybdenum (Mo)-Dissolved			101.6		%		80-120	28-SEP-18
Nickel (Ni)-Dissolved			97.4		%		80-120	28-SEP-18
Potassium (K)-Dissolved			98.6		%		80-120	28-SEP-18
Selenium (Se)-Dissolved			94.4		%		80-120	28-SEP-18
Silicon (Si)-Dissolved			99.9		%		60-140	28-SEP-18
Silver (Ag)-Dissolved			99.4		%		80-120	28-SEP-18
Sodium (Na)-Dissolved			95.4		%		80-120	28-SEP-18
Strontium (Sr)-Dissolved			101.6		%		80-120	28-SEP-18
Thallium (Tl)-Dissolved			97.8		%		80-120	28-SEP-18
Tin (Sn)-Dissolved			98.3		%		80-120	28-SEP-18
Titanium (Ti)-Dissolved			98.3		%		80-120	28-SEP-18
Uranium (U)-Dissolved			99.5		%		80-120	28-SEP-18
Vanadium (V)-Dissolved			99.3		%		80-120	28-SEP-18
Zinc (Zn)-Dissolved			97.2		%		80-120	28-SEP-18
WG2889754-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	28-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	28-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4251153								
WG2889754-1 MB		**LF**						
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	28-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	28-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	28-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	28-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	28-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	28-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	28-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
WG2889754-4 MS		**L2166053-1**						
Aluminum (Al)-Dissolved			94.8		%		70-130	28-SEP-18
Antimony (Sb)-Dissolved			98.6		%		70-130	28-SEP-18
Arsenic (As)-Dissolved			106.9		%		70-130	28-SEP-18
Barium (Ba)-Dissolved			96.6		%		70-130	28-SEP-18
Bismuth (Bi)-Dissolved			86.8		%		70-130	28-SEP-18
Boron (B)-Dissolved			96.4		%		70-130	28-SEP-18
Cadmium (Cd)-Dissolved			98.3		%		70-130	28-SEP-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	28-SEP-18
Chromium (Cr)-Dissolved			92.6		%		70-130	28-SEP-18
Cobalt (Co)-Dissolved			90.3		%		70-130	28-SEP-18
Copper (Cu)-Dissolved			91.1		%		70-130	28-SEP-18
Iron (Fe)-Dissolved			92.8		%		70-130	28-SEP-18
Lead (Pb)-Dissolved			93.3		%		70-130	28-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4251153								
WG2889754-4 MS		**L2166053-1**						
Lithium (Li)-Dissolved			94.3		%		70-130	28-SEP-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	28-SEP-18
Manganese (Mn)-Dissolved			93.8		%		70-130	28-SEP-18
Molybdenum (Mo)-Dissolved			96.9		%		70-130	28-SEP-18
Nickel (Ni)-Dissolved			90.8		%		70-130	28-SEP-18
Potassium (K)-Dissolved			96.1		%		70-130	28-SEP-18
Selenium (Se)-Dissolved			110.6		%		70-130	28-SEP-18
Silicon (Si)-Dissolved			87.6		%		70-130	28-SEP-18
Silver (Ag)-Dissolved			98.9		%		70-130	28-SEP-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	28-SEP-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	28-SEP-18
Thallium (Tl)-Dissolved			93.3		%		70-130	28-SEP-18
Tin (Sn)-Dissolved			95.3		%		70-130	28-SEP-18
Titanium (Ti)-Dissolved			94.0		%		70-130	28-SEP-18
Uranium (U)-Dissolved			94.0		%		70-130	28-SEP-18
Vanadium (V)-Dissolved			96.9		%		70-130	28-SEP-18
Zinc (Zn)-Dissolved			96.4		%		70-130	28-SEP-18
Batch R4251400								
WG2890179-3 DUP		**L2166053-2**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	28-SEP-18
Antimony (Sb)-Dissolved		0.00081	0.00082		mg/L	0.7	20	28-SEP-18
Arsenic (As)-Dissolved		0.00024	0.00024		mg/L	0.1	20	28-SEP-18
Barium (Ba)-Dissolved		0.0390	0.0379		mg/L	2.8	20	28-SEP-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-SEP-18
Boron (B)-Dissolved		0.011	0.010		mg/L	1.2	20	28-SEP-18
Cadmium (Cd)-Dissolved		0.0000074	0.0000089		mg/L	18	20	28-SEP-18
Calcium (Ca)-Dissolved		162	164		mg/L	1.0	20	28-SEP-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-SEP-18
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-SEP-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-SEP-18
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-SEP-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-SEP-18
Lithium (Li)-Dissolved		0.0194	0.0191		mg/L	1.5	20	28-SEP-18
Magnesium (Mg)-Dissolved		169	166		mg/L	1.7	20	28-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4251400								
WG2890179-3 DUP		**L2166053-2**						
Manganese (Mn)-Dissolved		0.00026	0.00029		mg/L	12	20	28-SEP-18
Molybdenum (Mo)-Dissolved		0.00300	0.00301		mg/L	0.2	20	28-SEP-18
Nickel (Ni)-Dissolved		0.0174	0.0173		mg/L	0.6	20	28-SEP-18
Potassium (K)-Dissolved		2.56	2.66		mg/L	3.9	20	28-SEP-18
Selenium (Se)-Dissolved		0.185	0.184		mg/L	1.0	20	28-SEP-18
Silicon (Si)-Dissolved		2.76	2.75		mg/L	0.3	20	28-SEP-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-SEP-18
Sodium (Na)-Dissolved		2.74	2.76		mg/L	1.0	20	28-SEP-18
Strontium (Sr)-Dissolved		0.181	0.181		mg/L	0.1	20	28-SEP-18
Thallium (Tl)-Dissolved		0.000010	0.000011		mg/L	9.8	20	28-SEP-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-SEP-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-SEP-18
Uranium (U)-Dissolved		0.00776	0.00786		mg/L	1.2	20	28-SEP-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-SEP-18
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	28-SEP-18
WG2890179-2 LCS								
Aluminum (Al)-Dissolved			98.4		%		80-120	28-SEP-18
Antimony (Sb)-Dissolved			96.3		%		80-120	28-SEP-18
Arsenic (As)-Dissolved			98.2		%		80-120	28-SEP-18
Barium (Ba)-Dissolved			99.1		%		80-120	28-SEP-18
Bismuth (Bi)-Dissolved			95.1		%		80-120	28-SEP-18
Boron (B)-Dissolved			98.0		%		80-120	28-SEP-18
Cadmium (Cd)-Dissolved			97.3		%		80-120	28-SEP-18
Calcium (Ca)-Dissolved			95.6		%		80-120	28-SEP-18
Chromium (Cr)-Dissolved			100.3		%		80-120	28-SEP-18
Cobalt (Co)-Dissolved			99.5		%		80-120	28-SEP-18
Copper (Cu)-Dissolved			96.9		%		80-120	28-SEP-18
Iron (Fe)-Dissolved			96.1		%		80-120	28-SEP-18
Lead (Pb)-Dissolved			93.6		%		80-120	28-SEP-18
Lithium (Li)-Dissolved			96.2		%		80-120	28-SEP-18
Magnesium (Mg)-Dissolved			106.1		%		80-120	28-SEP-18
Manganese (Mn)-Dissolved			99.0		%		80-120	28-SEP-18
Molybdenum (Mo)-Dissolved			96.6		%		80-120	28-SEP-18
Nickel (Ni)-Dissolved			96.8		%		80-120	28-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4251400								
WG2890179-2 LCS								
Potassium (K)-Dissolved			98.1		%		80-120	28-SEP-18
Selenium (Se)-Dissolved			94.7		%		80-120	28-SEP-18
Silicon (Si)-Dissolved			97.9		%		60-140	28-SEP-18
Silver (Ag)-Dissolved			94.7		%		80-120	28-SEP-18
Sodium (Na)-Dissolved			102.4		%		80-120	28-SEP-18
Strontium (Sr)-Dissolved			95.3		%		80-120	28-SEP-18
Thallium (Tl)-Dissolved			96.1		%		80-120	28-SEP-18
Tin (Sn)-Dissolved			97.1		%		80-120	28-SEP-18
Titanium (Ti)-Dissolved			94.7		%		80-120	28-SEP-18
Uranium (U)-Dissolved			95.7		%		80-120	28-SEP-18
Vanadium (V)-Dissolved			102.2		%		80-120	28-SEP-18
Zinc (Zn)-Dissolved			95.5		%		80-120	28-SEP-18
WG2890179-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	28-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	28-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	28-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	28-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	28-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	28-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	28-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4251400								
WG2890179-1 MB		**LF**						
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	28-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	28-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	28-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4231871								
WG2881405-2 LCS								
Aluminum (Al)-Total			103.3		%		80-120	21-SEP-18
Antimony (Sb)-Total			102.0		%		80-120	21-SEP-18
Arsenic (As)-Total			98.6		%		80-120	21-SEP-18
Barium (Ba)-Total			101.3		%		80-120	21-SEP-18
Bismuth (Bi)-Total			106.7		%		80-120	21-SEP-18
Boron (B)-Total			97.4		%		80-120	21-SEP-18
Cadmium (Cd)-Total			98.3		%		80-120	21-SEP-18
Calcium (Ca)-Total			99.6		%		80-120	21-SEP-18
Chromium (Cr)-Total			101.7		%		80-120	21-SEP-18
Cobalt (Co)-Total			97.9		%		80-120	21-SEP-18
Copper (Cu)-Total			96.5		%		80-120	21-SEP-18
Iron (Fe)-Total			97.8		%		80-120	21-SEP-18
Lead (Pb)-Total			99.4		%		80-120	21-SEP-18
Lithium (Li)-Total			103.2		%		80-120	21-SEP-18
Magnesium (Mg)-Total			103.7		%		80-120	21-SEP-18
Manganese (Mn)-Total			101.1		%		80-120	21-SEP-18
Molybdenum (Mo)-Total			97.3		%		80-120	21-SEP-18
Nickel (Ni)-Total			99.8		%		80-120	21-SEP-18
Potassium (K)-Total			101.1		%		80-120	21-SEP-18
Selenium (Se)-Total			97.1		%		80-120	21-SEP-18
Silicon (Si)-Total			107.9		%		80-120	21-SEP-18
Silver (Ag)-Total			99.9		%		80-120	21-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4231871								
WG2881405-2 LCS								
Sodium (Na)-Total			109.2		%		80-120	21-SEP-18
Strontium (Sr)-Total			99.0		%		80-120	21-SEP-18
Thallium (Tl)-Total			106.9		%		80-120	21-SEP-18
Tin (Sn)-Total			96.9		%		80-120	21-SEP-18
Titanium (Ti)-Total			97.2		%		80-120	21-SEP-18
Uranium (U)-Total			111.2		%		80-120	21-SEP-18
Vanadium (V)-Total			101.0		%		80-120	21-SEP-18
Zinc (Zn)-Total			94.1		%		80-120	21-SEP-18
WG2881405-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	21-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	21-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	21-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	21-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	21-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	21-SEP-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	21-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	21-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	21-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	21-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	21-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	21-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	21-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	21-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	21-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	21-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	21-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	21-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	21-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	21-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	21-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	21-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	21-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	21-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	21-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4231871								
WG2881405-1 MB								
Tin (Sn)-Total			<0.00010		mg/L		0.0001	21-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	21-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	21-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	21-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	21-SEP-18
Batch R4251540								
WG2890212-2 LCS								
Aluminum (Al)-Total			102.2		%		80-120	28-SEP-18
Antimony (Sb)-Total			111.1		%		80-120	28-SEP-18
Arsenic (As)-Total			104.4		%		80-120	28-SEP-18
Barium (Ba)-Total			105.4		%		80-120	28-SEP-18
Bismuth (Bi)-Total			103.9		%		80-120	28-SEP-18
Boron (B)-Total			101.6		%		80-120	28-SEP-18
Cadmium (Cd)-Total			104.8		%		80-120	28-SEP-18
Calcium (Ca)-Total			101.8		%		80-120	28-SEP-18
Chromium (Cr)-Total			102.2		%		80-120	28-SEP-18
Cobalt (Co)-Total			100.3		%		80-120	28-SEP-18
Copper (Cu)-Total			100.9		%		80-120	28-SEP-18
Iron (Fe)-Total			97.4		%		80-120	28-SEP-18
Lead (Pb)-Total			103.6		%		80-120	28-SEP-18
Lithium (Li)-Total			97.0		%		80-120	28-SEP-18
Magnesium (Mg)-Total			100.1		%		80-120	28-SEP-18
Manganese (Mn)-Total			104.1		%		80-120	28-SEP-18
Molybdenum (Mo)-Total			108.0		%		80-120	28-SEP-18
Nickel (Ni)-Total			100.6		%		80-120	28-SEP-18
Potassium (K)-Total			104.9		%		80-120	28-SEP-18
Selenium (Se)-Total			102.0		%		80-120	28-SEP-18
Silicon (Si)-Total			101.0		%		80-120	28-SEP-18
Silver (Ag)-Total			106.5		%		80-120	28-SEP-18
Sodium (Na)-Total			103.6		%		80-120	28-SEP-18
Strontium (Sr)-Total			105.8		%		80-120	28-SEP-18
Thallium (Tl)-Total			103.4		%		80-120	28-SEP-18
Tin (Sn)-Total			103.1		%		80-120	28-SEP-18
Titanium (Ti)-Total			100.5		%		80-120	28-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4251540								
WG2890212-2 LCS								
Uranium (U)-Total			103.9		%		80-120	28-SEP-18
Vanadium (V)-Total			105.0		%		80-120	28-SEP-18
Zinc (Zn)-Total			102.3		%		80-120	28-SEP-18
WG2890212-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	28-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	28-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	28-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	28-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	28-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	28-SEP-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	28-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	28-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	28-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	28-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	28-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	28-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	28-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	28-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	28-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	28-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	28-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	28-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	28-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	28-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	28-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	28-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	28-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	28-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	28-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	28-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	28-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	28-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	28-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	28-SEP-18
WG2890212-4 MS		**L2166053-2**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4251540								
WG2890212-4 MS		**L2166053-2**						
Aluminum (Al)-Total			97.9		%		70-130	28-SEP-18
Antimony (Sb)-Total			102.7		%		70-130	28-SEP-18
Arsenic (As)-Total			104.8		%		70-130	28-SEP-18
Barium (Ba)-Total			N/A	MS-B	%		-	28-SEP-18
Bismuth (Bi)-Total			91.6		%		70-130	28-SEP-18
Boron (B)-Total			98.7		%		70-130	28-SEP-18
Cadmium (Cd)-Total			102.0		%		70-130	28-SEP-18
Calcium (Ca)-Total			N/A	MS-B	%		-	28-SEP-18
Chromium (Cr)-Total			100.6		%		70-130	28-SEP-18
Cobalt (Co)-Total			95.5		%		70-130	28-SEP-18
Copper (Cu)-Total			95.2		%		70-130	28-SEP-18
Iron (Fe)-Total			95.0		%		70-130	28-SEP-18
Lead (Pb)-Total			90.8		%		70-130	28-SEP-18
Lithium (Li)-Total			94.1		%		70-130	28-SEP-18
Magnesium (Mg)-Total			N/A	MS-B	%		-	28-SEP-18
Manganese (Mn)-Total			N/A	MS-B	%		-	28-SEP-18
Molybdenum (Mo)-Total			100.1		%		70-130	28-SEP-18
Nickel (Ni)-Total			94.0		%		70-130	28-SEP-18
Potassium (K)-Total			100.9		%		70-130	28-SEP-18
Selenium (Se)-Total			99.5		%		70-130	28-SEP-18
Silicon (Si)-Total			91.4		%		70-130	28-SEP-18
Silver (Ag)-Total			101.1		%		70-130	28-SEP-18
Sodium (Na)-Total			N/A	MS-B	%		-	28-SEP-18
Strontium (Sr)-Total			N/A	MS-B	%		-	28-SEP-18
Thallium (Tl)-Total			91.6		%		70-130	28-SEP-18
Tin (Sn)-Total			95.5		%		70-130	28-SEP-18
Titanium (Ti)-Total			97.9		%		70-130	28-SEP-18
Uranium (U)-Total			93.4		%		70-130	28-SEP-18
Vanadium (V)-Total			104.7		%		70-130	28-SEP-18
Zinc (Zn)-Total			95.9		%		70-130	28-SEP-18
NH3-L-F-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-L-F-CL	**Water**							
Batch R4244007								
WG2887722-6 LCS								
Ammonia as N			94.7		%		85-115	26-SEP-18
WG2887722-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	26-SEP-18
NO2-L-IC-N-CL	**Water**							
Batch R4224507								
WG2880947-14 LCS								
Nitrite (as N)			102.3		%		90-110	18-SEP-18
WG2880947-13 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-SEP-18
NO3-L-IC-N-CL	**Water**							
Batch R4224507								
WG2880947-14 LCS								
Nitrate (as N)			100.4		%		90-110	18-SEP-18
WG2880947-13 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-SEP-18
ORP-CL	**Water**							
Batch R4228571								
WG2880909-5 CRM		**CL-ORP**						
ORP			222		mV		210-230	19-SEP-18
WG2880909-7 CRM		**CL-ORP**						
ORP			223		mV		210-230	19-SEP-18
P-T-L-COL-CL	**Water**							
Batch R4245954								
WG2887571-70 LCS								
Phosphorus (P)-Total			103.9		%		80-120	26-SEP-18
WG2887571-69 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	26-SEP-18
PH-CL	**Water**							
Batch R4243953								
WG2887053-8 LCS								
pH			7.01		pH		6.9-7.1	25-SEP-18
PO4-DO-L-COL-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-L-COL-CL	**Water**							
Batch R4230728								
WG2881207-6 LCS								
Orthophosphate-Dissolved (as P)			101.0		%		80-120	18-SEP-18
WG2881207-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-SEP-18
SO4-IC-N-CL	**Water**							
Batch R4224507								
WG2880947-14 LCS								
Sulfate (SO4)			100.7		%		90-110	18-SEP-18
WG2880947-13 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-SEP-18
SOLIDS-TDS-CL	**Water**							
Batch R4235508								
WG2883004-5 LCS								
Total Dissolved Solids			96.6		%		85-115	21-SEP-18
WG2883004-4 MB								
Total Dissolved Solids			<10		mg/L		10	21-SEP-18
TKN-L-F-CL	**Water**							
Batch R4234450								
WG2883730-3 DUP		**L2166053-4**						
Total Kjeldahl Nitrogen		0.209	0.192		mg/L	8.5	20	23-SEP-18
WG2883730-2 LCS								
Total Kjeldahl Nitrogen			95.5		%		75-125	23-SEP-18
WG2883730-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	23-SEP-18
WG2883730-4 MS		**L2166053-4**						
Total Kjeldahl Nitrogen			94.0		%		70-130	23-SEP-18
TSS-L-CL	**Water**							
Batch R4235889								
WG2883270-12 DUP		**L2166053-1**						
Total Suspended Solids		17.1	17.1		mg/L	0.0	20	21-SEP-18
WG2883270-11 LCS								
Total Suspended Solids			96.0		%		85-115	21-SEP-18
WG2883270-5 LCS								
Total Suspended Solids			104.4		%		85-115	21-SEP-18
WG2883270-10 MB								
Total Suspended Solids			<1.0		mg/L		1	21-SEP-18
WG2883270-4 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-L-CL	**Water**							
Batch R4235889								
WG2883270-4 MB								
Total Suspended Solids			<1.0		mg/L		1	21-SEP-18
TURBIDITY-CL	**Water**							
Batch R4223488								
WG2879443-16 DUP		**L2166053-1**						
Turbidity		20.6	20.5		NTU	0.5	15	18-SEP-18
WG2879443-10 LCS								
Turbidity			97.0		%		85-115	18-SEP-18
WG2879443-14 LCS								
Turbidity			96.5		%		85-115	18-SEP-18
WG2879443-2 LCS								
Turbidity			97.5		%		85-115	18-SEP-18
WG2879443-1 MB								
Turbidity			<0.10		NTU		0.1	18-SEP-18
WG2879443-13 MB								
Turbidity			<0.10		NTU		0.1	18-SEP-18
WG2879443-9 MB								
Turbidity			<0.10		NTU		0.1	18-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	17-SEP-18 10:07	19-SEP-18 13:16	0.25	51	hours	EHTR-FM
	2	17-SEP-18 10:39	19-SEP-18 13:16	0.25	51	hours	EHTR-FM
	4	17-SEP-18 13:38	19-SEP-18 13:16	0.25	48	hours	EHTR-FM
pH							
	1	17-SEP-18 10:07	25-SEP-18 11:00	0.25	193	hours	EHTR-FM
	2	17-SEP-18 10:39	25-SEP-18 11:00	0.25	192	hours	EHTR-FM
	4	17-SEP-18 13:38	25-SEP-18 11:00	0.25	189	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2166053 were received on 18-SEP-18 09:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Greenhills Operation			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jeremy Enns			Lab Contact	Lyudmyla Shvets			Email 1:	Jeremy.Enns@teck.com	X	X	X
Email	Jeremy.Enns@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	jennifer.kropp@teck.com	X	X	X
Address	P.O. BOX 5000			Address	2559 29 Street NE			Email 3:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B1H0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada					
Phone Number	250-865-3341			Phone Number	403 407 1794							

L2166053-COFC

L2166053

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont...	ANALYSIS REQUESTED: Filtered (F: Field, FL: Field & Lab, N: None)												
								FIELD FILTERED	N	N	N		N	N	N						
								PRESERVED	NONE	H2SO4	NONE	HCL	NONE	NONE	HNO3					
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-ROUTINE-VA	TECKCOAL-MET-T-VA	HG-T-U-CVAF-VA					
GH_MW-RLP_WG_2018-07-01_NP	GH_MW-RLP	WG		Sept. 17	10:07	G	6		1	1	1	1	1	1						
GH_POTW09_WG_2018-07-01_NP	GH_POTW09	WG		Sept. 17	10:39	G	7		1	1	1	1	1	1	1					
GH_SITE-C_WEIR_WS_2018-09-03_FB-HG-NP	GH_SITE-C_WEIR	WS		Sept. 17	13:38	G	1									1				
GH_SITE-C_WEIR_WS_2018-09-03_NP-NP	GH_SITE-C_WEIR	WS		Sept. 17	13:38	G	7		1	1	1		1	1	1	1				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
				9/18 9:10

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	KC	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

7°C

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
BOX 5000
ELKFORD BC V0B1H0

Date Received: 05-OCT-18
Report Date: 15-OCT-18 15:19 (MT)
Version: FINAL

Client Phone: 250-865-3305

Certificate of Analysis

Lab Work Order #: L2176772

Project P.O. #: VPO00540380
Job Reference: GREENHILLS OPERATION
C of C Numbers: QTR_WG_2018-10-01
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-1 GH_GA-MW-1_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 10:30							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	4.05		0.50	mg/L		12-OCT-18	R4277188
Total Kjeldahl Nitrogen	0.549		0.050	mg/L		10-OCT-18	R4268769
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		13-OCT-18	R4276568
Total Organic Carbon	3.41		0.50	mg/L		12-OCT-18	R4277188
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	07-OCT-18	10-OCT-18	R4270315
Dissolved Metals Filtration Location	FIELD					07-OCT-18	R4263749
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	07-OCT-18	11-OCT-18	R4269787
Dissolved Mercury Filtration Location	FIELD					07-OCT-18	R4263691
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					07-OCT-18	R4263749
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	07-OCT-18	10-OCT-18	R4270315
Antimony (Sb)-Dissolved	0.00098		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Arsenic (As)-Dissolved	0.00077		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Barium (Ba)-Dissolved	0.0475		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Boron (B)-Dissolved	0.795		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Cadmium (Cd)-Dissolved	0.0324		0.0050	ug/L	07-OCT-18	10-OCT-18	R4270315
Calcium (Ca)-Dissolved	72.0		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Chromium (Cr)-Dissolved	0.00017		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Cobalt (Co)-Dissolved	1.12		0.10	ug/L	07-OCT-18	10-OCT-18	R4270315
Copper (Cu)-Dissolved	0.0665		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Iron (Fe)-Dissolved	0.163		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Lithium (Li)-Dissolved	0.156		0.0010	mg/L	07-OCT-18	10-OCT-18	R4270315
Magnesium (Mg)-Dissolved	42.4		0.10	mg/L	07-OCT-18	10-OCT-18	R4270315
Manganese (Mn)-Dissolved	0.486		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Molybdenum (Mo)-Dissolved	0.00809		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Nickel (Ni)-Dissolved	0.00445		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Potassium (K)-Dissolved	3.89		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Selenium (Se)-Dissolved	0.130		0.050	ug/L	07-OCT-18	10-OCT-18	R4270315
Silicon (Si)-Dissolved	4.05		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Silver (Ag)-Dissolved	<0.000020	DLA	0.000020	mg/L	07-OCT-18	11-OCT-18	R4275015
Sodium (Na)-Dissolved	180		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Strontium (Sr)-Dissolved	5.04		0.00020	mg/L	07-OCT-18	10-OCT-18	R4270315
Thallium (Tl)-Dissolved	0.000031		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Uranium (U)-Dissolved	0.00205		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Zinc (Zn)-Dissolved	0.0066		0.0010	mg/L	07-OCT-18	10-OCT-18	R4270315
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<2.0		2.0	mg/L		14-OCT-18	R4277935
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	375		1.0	mg/L		11-OCT-18	R4275292
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		11-OCT-18	R4275292
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		11-OCT-18	R4275292
Alkalinity, Total (as CaCO3)	375		1.0	mg/L		11-OCT-18	R4275292

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-1 GH_GA-MW-1_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 10:30							
Matrix: WG							
Ammonia, Total (as N)							
Ammonia as N	0.247		0.0050	mg/L		12-OCT-18	R4276013
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLHC	0.25	mg/L		05-OCT-18	R4263431
Chloride in Water by IC							
Chloride (Cl)	14.4	DLHC	2.5	mg/L		05-OCT-18	R4263431
Electrical Conductivity (EC)							
Conductivity (@ 25C)	1010		2.0	uS/cm		11-OCT-18	R4275292
Fluoride in Water by IC							
Fluoride (F)	0.71	DLHC	0.10	mg/L		05-OCT-18	R4263431
Ion Balance Calculation							
Ion Balance	115		-100	%		15-OCT-18	
Ion Balance Calculation							
Cation - Anion Balance	7.1			%		15-OCT-18	
Anion Sum	13.0			meq/L		15-OCT-18	
Cation Sum	15.1			meq/L		15-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	1.80	DLHC	0.025	mg/L		05-OCT-18	R4263431
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0050	DLHC	0.0050	mg/L		05-OCT-18	R4263431
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	0.0278		0.0010	mg/L		06-OCT-18	R4268789
Oxidation redution potential by elect.							
ORP	354		-1000	mV		11-OCT-18	R4276673
Phosphorus (P)-Total							
Phosphorus (P)-Total	0.0419		0.0020	mg/L		11-OCT-18	R4271227
Sulfate in Water by IC							
Sulfate (SO4)	240	DLHC	1.5	mg/L		05-OCT-18	R4263431
Total Dissolved Solids							
Total Dissolved Solids	711	DLHC	20	mg/L		11-OCT-18	R4275928
Total Suspended Solids							
Total Suspended Solids	2.7		1.0	mg/L		11-OCT-18	R4274975
Turbidity							
Turbidity	1.88		0.10	NTU		06-OCT-18	R4264647
pH							
pH	8.15		0.10	pH		11-OCT-18	R4275292
L2176772-2 GH_GA-MW-2_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 12:55							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	0.53		0.50	mg/L		12-OCT-18	R4277188
Total Kjeldahl Nitrogen	0.076	TKNI	0.050	mg/L		10-OCT-18	R4268769
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		13-OCT-18	R4276568
Total Organic Carbon	0.55		0.50	mg/L		12-OCT-18	R4277188
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	07-OCT-18	10-OCT-18	R4270315
Dissolved Metals Filtration Location	FIELD					07-OCT-18	R4263749
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	11-OCT-18	11-OCT-18	R4273149
Dissolved Mercury Filtration Location	FIELD					11-OCT-18	R4269890
Dissolved Metals in Water by CRC ICPMS							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-2 GH_GA-MW-2_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 12:55							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					07-OCT-18	R4263749
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	07-OCT-18	10-OCT-18	R4270315
Antimony (Sb)-Dissolved	0.00196		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Arsenic (As)-Dissolved	0.00028		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Barium (Ba)-Dissolved	0.0592		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Boron (B)-Dissolved	0.020		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Cadmium (Cd)-Dissolved	<0.075	DLM	0.075	ug/L	07-OCT-18	10-OCT-18	R4270315
Calcium (Ca)-Dissolved	135		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Cobalt (Co)-Dissolved	0.35		0.10	ug/L	07-OCT-18	10-OCT-18	R4270315
Copper (Cu)-Dissolved	0.00390		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Lithium (Li)-Dissolved	0.0165		0.0010	mg/L	07-OCT-18	10-OCT-18	R4270315
Magnesium (Mg)-Dissolved	39.1		0.10	mg/L	07-OCT-18	10-OCT-18	R4270315
Manganese (Mn)-Dissolved	0.0711		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Molybdenum (Mo)-Dissolved	0.0630		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Nickel (Ni)-Dissolved	0.00704		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Potassium (K)-Dissolved	1.21		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Selenium (Se)-Dissolved	12.8		0.050	ug/L	07-OCT-18	10-OCT-18	R4270315
Silicon (Si)-Dissolved	3.45		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Sodium (Na)-Dissolved	9.53		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Strontium (Sr)-Dissolved	0.535		0.00020	mg/L	07-OCT-18	10-OCT-18	R4270315
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Uranium (U)-Dissolved	0.00628		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Zinc (Zn)-Dissolved	0.0091		0.0010	mg/L	07-OCT-18	10-OCT-18	R4270315
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	5.4		2.0	mg/L		14-OCT-18	R4277935
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	185		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Total (as CaCO3)	185		1.0	mg/L		12-OCT-18	R4276037
Ammonia, Total (as N)							
Ammonia as N	0.0173		0.0050	mg/L		12-OCT-18	R4276013
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLHC	0.25	mg/L		05-OCT-18	R4263431
Chloride in Water by IC							
Chloride (Cl)	7.4	DLHC	2.5	mg/L		05-OCT-18	R4263431
Electrical Conductivity (EC)							
Conductivity (@ 25C)	764		2.0	uS/cm		12-OCT-18	R4276037
Fluoride in Water by IC							
Fluoride (F)	0.13	DLHC	0.10	mg/L		05-OCT-18	R4263431
Ion Balance Calculation							
Ion Balance	104		-100	%		15-OCT-18	
Ion Balance Calculation							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-2 GH_GA-MW-2_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 12:55							
Matrix: WG							
Ion Balance Calculation							
Cation - Anion Balance	2.0			%		15-OCT-18	
Anion Sum	10.0			meq/L		15-OCT-18	
Cation Sum	10.4			meq/L		15-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	5.83	DLHC	0.025	mg/L		05-OCT-18	R4263431
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.120	DLHC	0.0050	mg/L		05-OCT-18	R4263431
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	0.0017		0.0010	mg/L		06-OCT-18	R4268789
Oxidation redution potential by elect.							
ORP	432		-1000	mV		11-OCT-18	R4276673
Phosphorus (P)-Total							
Phosphorus (P)-Total	0.0050		0.0020	mg/L		11-OCT-18	R4271227
Sulfate in Water by IC							
Sulfate (SO4)	272	DLHC	1.5	mg/L		05-OCT-18	R4263431
Total Dissolved Solids							
Total Dissolved Solids	643	DLHC	20	mg/L		11-OCT-18	R4275928
Total Suspended Solids							
Total Suspended Solids	6.6		1.0	mg/L		11-OCT-18	R4274975
Turbidity							
Turbidity	2.47		0.10	NTU		06-OCT-18	R4264647
pH							
pH	8.04		0.10	pH		12-OCT-18	R4276037
L2176772-3 GH_GA-MW-4_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 11:35							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	<0.50		0.50	mg/L		12-OCT-18	R4277188
Total Kjeldahl Nitrogen	0.152		0.050	mg/L		10-OCT-18	R4268769
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		13-OCT-18	R4276568
Total Organic Carbon	<0.50		0.50	mg/L		12-OCT-18	R4277188
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	07-OCT-18	10-OCT-18	R4270315
Dissolved Metals Filtration Location	FIELD					07-OCT-18	R4263749
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	07-OCT-18	11-OCT-18	R4269787
Dissolved Mercury Filtration Location	FIELD					07-OCT-18	R4263691
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					07-OCT-18	R4263749
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	07-OCT-18	10-OCT-18	R4270315
Antimony (Sb)-Dissolved	0.00015		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Arsenic (As)-Dissolved	0.00010		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Barium (Ba)-Dissolved	0.0783		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Boron (B)-Dissolved	0.014		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Cadmium (Cd)-Dissolved	0.0067		0.0050	ug/L	07-OCT-18	10-OCT-18	R4270315
Calcium (Ca)-Dissolved	52.9		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Chromium (Cr)-Dissolved	0.00022		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	07-OCT-18	10-OCT-18	R4270315
Copper (Cu)-Dissolved	0.00154		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-3 GH_GA-MW-4_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 11:35							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Lithium (Li)-Dissolved	0.0185		0.0010	mg/L	07-OCT-18	10-OCT-18	R4270315
Magnesium (Mg)-Dissolved	21.1		0.10	mg/L	07-OCT-18	10-OCT-18	R4270315
Manganese (Mn)-Dissolved	0.00026		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Molybdenum (Mo)-Dissolved	0.00201		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Potassium (K)-Dissolved	1.05		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Selenium (Se)-Dissolved	2.01		0.050	ug/L	07-OCT-18	10-OCT-18	R4270315
Silicon (Si)-Dissolved	2.27		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Sodium (Na)-Dissolved	5.13		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Strontium (Sr)-Dissolved	0.175		0.00020	mg/L	07-OCT-18	10-OCT-18	R4270315
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Uranium (U)-Dissolved	0.00141		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Zinc (Zn)-Dissolved	0.0037		0.0010	mg/L	07-OCT-18	10-OCT-18	R4270315
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<2.0		2.0	mg/L		14-OCT-18	R4277935
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	195		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Carbonate (as CaCO3)	12.6		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Total (as CaCO3)	208		1.0	mg/L		12-OCT-18	R4276037
Ammonia, Total (as N)							
Ammonia as N	0.0153		0.0050	mg/L		12-OCT-18	R4276013
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		05-OCT-18	R4263431
Chloride in Water by IC							
Chloride (Cl)	3.10		0.50	mg/L		05-OCT-18	R4263431
Electrical Conductivity (EC)							
Conductivity (@ 25C)	383		2.0	uS/cm		12-OCT-18	R4276037
Fluoride in Water by IC							
Fluoride (F)	0.199		0.020	mg/L		05-OCT-18	R4263431
Ion Balance Calculation							
Cation - Anion Balance	-3.8			%		15-OCT-18	
Anion Sum	4.99			meq/L		15-OCT-18	
Cation Sum	4.63			meq/L		15-OCT-18	
Ion Balance Calculation							
Ion Balance	92.7		-100	%		15-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.587		0.0050	mg/L		05-OCT-18	R4263431
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0010		0.0010	mg/L		05-OCT-18	R4263431
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	0.0018		0.0010	mg/L		06-OCT-18	R4268789
Oxidation redution potential by elect.							
ORP	397		-1000	mV		11-OCT-18	R4276673
Phosphorus (P)-Total							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-3 GH_GA-MW-4_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 11:35							
Matrix: WG							
Phosphorus (P)-Total							
Phosphorus (P)-Total	<0.0020		0.0020	mg/L		11-OCT-18	R4271227
Sulfate in Water by IC							
Sulfate (SO4)	33.9		0.30	mg/L		05-OCT-18	R4263431
Total Dissolved Solids							
Total Dissolved Solids	234	DLHC	20	mg/L		11-OCT-18	R4275928
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		11-OCT-18	R4274975
Turbidity							
Turbidity	0.14		0.10	NTU		06-OCT-18	R4264647
pH							
pH	8.51		0.10	pH		12-OCT-18	R4276037
L2176772-4 GH_GHER1_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 10:30							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	3.06		0.50	mg/L		12-OCT-18	R4277188
Total Kjeldahl Nitrogen	0.408		0.050	mg/L		10-OCT-18	R4268769
Total Organic Carbon	3.30		0.50	mg/L		12-OCT-18	R4277188
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	07-OCT-18	11-OCT-18	R4269787
Dissolved Mercury Filtration Location	FIELD					07-OCT-18	R4263691
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	246		0.50	mg/L		15-OCT-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		10-OCT-18	R4270315
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		13-OCT-18	R4276568
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0191		0.0030	mg/L		10-OCT-18	R4270315
Antimony (Sb)-Total	0.00097		0.00010	mg/L		10-OCT-18	R4270315
Arsenic (As)-Total	0.00053		0.00010	mg/L		10-OCT-18	R4270315
Barium (Ba)-Total	0.0393		0.00010	mg/L		10-OCT-18	R4270315
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		10-OCT-18	R4270315
Boron (B)-Total	0.820		0.010	mg/L		10-OCT-18	R4270315
Cadmium (Cd)-Total	0.0297		0.0050	ug/L		10-OCT-18	R4270315
Calcium (Ca)-Total	57.7		0.050	mg/L		10-OCT-18	R4270315
Chromium (Cr)-Total	0.00058		0.00010	mg/L		10-OCT-18	R4270315
Cobalt (Co)-Total	0.68		0.10	ug/L		10-OCT-18	R4270315
Copper (Cu)-Total	0.0687		0.00050	mg/L		10-OCT-18	R4270315
Iron (Fe)-Total	0.067		0.010	mg/L		10-OCT-18	R4270315
Lead (Pb)-Total	<0.000050		0.000050	mg/L		10-OCT-18	R4270315
Lithium (Li)-Total	0.150		0.0010	mg/L		10-OCT-18	R4270315
Magnesium (Mg)-Total	33.2		0.10	mg/L		10-OCT-18	R4270315
Manganese (Mn)-Total	0.185		0.00010	mg/L		10-OCT-18	R4270315
Molybdenum (Mo)-Total	0.00627		0.000050	mg/L		10-OCT-18	R4270315
Nickel (Ni)-Total	0.00384		0.00050	mg/L		10-OCT-18	R4270315
Potassium (K)-Total	2.99		0.050	mg/L		10-OCT-18	R4270315
Selenium (Se)-Total	0.120		0.050	ug/L		10-OCT-18	R4270315
Silicon (Si)-Total	3.75		0.10	mg/L		10-OCT-18	R4270315
Silver (Ag)-Total	0.000024		0.000010	mg/L		10-OCT-18	R4270315

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-4 GH_GHER1_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 10:30							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Sodium (Na)-Total	151		0.050	mg/L		10-OCT-18	R4270315
Strontium (Sr)-Total	3.85		0.00020	mg/L		10-OCT-18	R4270315
Thallium (Tl)-Total	0.000034		0.000010	mg/L		10-OCT-18	R4270315
Tin (Sn)-Total	<0.00010		0.00010	mg/L		10-OCT-18	R4270315
Titanium (Ti)-Total	<0.010		0.010	mg/L		10-OCT-18	R4270315
Uranium (U)-Total	0.00172		0.000010	mg/L		10-OCT-18	R4270315
Vanadium (V)-Total	<0.00050		0.00050	mg/L		10-OCT-18	R4270315
Zinc (Zn)-Total	0.0044		0.0030	mg/L		10-OCT-18	R4270315
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	12.7		2.0	mg/L		14-OCT-18	R4277935
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	349		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Carbonate (as CaCO3)	24.2		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Total (as CaCO3)	374		1.0	mg/L		12-OCT-18	R4276037
Ammonia, Total (as N)							
Ammonia as N	0.235		0.0050	mg/L		12-OCT-18	R4276013
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLHC	0.25	mg/L		05-OCT-18	R4263431
Chloride in Water by IC							
Chloride (Cl)	14.6	DLHC	2.5	mg/L		05-OCT-18	R4263431
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	LAB					14-OCT-18	R4277673
Calcium (Ca)-Dissolved	54.7		0.050	mg/L		14-OCT-18	R4277727
Magnesium (Mg)-Dissolved	26.7		0.0050	mg/L		14-OCT-18	R4277727
Potassium (K)-Dissolved	3.22		0.050	mg/L		14-OCT-18	R4277727
Sodium (Na)-Dissolved	155		0.050	mg/L		14-OCT-18	R4277727
Electrical Conductivity (EC)							
Conductivity (@ 25C)	1040		2.0	uS/cm		12-OCT-18	R4276037
Fluoride in Water by IC							
Fluoride (F)	0.67	DLHC	0.10	mg/L		05-OCT-18	R4263431
Ion Balance Calculation							
Ion Balance	90.3		-100	%		15-OCT-18	
Ion Balance Calculation							
Cation - Anion Balance	-5.1			%		15-OCT-18	
Anion Sum	13.0			meq/L		15-OCT-18	
Cation Sum	11.8			meq/L		15-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	1.90	DLHC	0.025	mg/L		05-OCT-18	R4263431
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0050	DLHC	0.0050	mg/L		05-OCT-18	R4263431
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	0.0265		0.0010	mg/L		06-OCT-18	R4268789
Oxidation redution potential by elect.							
ORP	314		-1000	mV		11-OCT-18	R4276673
Phosphorus (P)-Total							
Phosphorus (P)-Total	0.0466		0.0020	mg/L		11-OCT-18	R4271227
Sulfate in Water by IC							
Sulfate (SO4)	240	DLHC	1.5	mg/L		05-OCT-18	R4263431
Total Dissolved Solids							
Total Dissolved Solids	707	DLHC	20	mg/L		11-OCT-18	R4275928

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-4 GH_GHER1_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 10:30							
Matrix: WG							
Total Suspended Solids							
Total Suspended Solids	2.0		1.0	mg/L		11-OCT-18	R4274975
Turbidity							
Turbidity	2.37		0.10	NTU		06-OCT-18	R4264647
pH							
pH	8.56		0.10	pH		12-OCT-18	R4276037
L2176772-5 GH_POTW10_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 13:44							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	<0.50		0.50	mg/L		12-OCT-18	R4277188
Total Kjeldahl Nitrogen	0.165		0.050	mg/L		10-OCT-18	R4268769
Total Organic Carbon	<0.50		0.50	mg/L		12-OCT-18	R4277188
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	07-OCT-18	10-OCT-18	R4270315
Dissolved Metals Filtration Location	FIELD					07-OCT-18	R4263749
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	07-OCT-18	11-OCT-18	R4269787
Dissolved Mercury Filtration Location	FIELD					07-OCT-18	R4263691
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					07-OCT-18	R4263749
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	07-OCT-18	10-OCT-18	R4270315
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Arsenic (As)-Dissolved	0.00106		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Barium (Ba)-Dissolved	0.0181		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Boron (B)-Dissolved	0.034		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Cadmium (Cd)-Dissolved	0.0097		0.0050	ug/L	07-OCT-18	10-OCT-18	R4270315
Calcium (Ca)-Dissolved	92.3		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Cobalt (Co)-Dissolved	0.15		0.10	ug/L	07-OCT-18	10-OCT-18	R4270315
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Iron (Fe)-Dissolved	0.641		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Lithium (Li)-Dissolved	0.0154		0.0010	mg/L	07-OCT-18	10-OCT-18	R4270315
Magnesium (Mg)-Dissolved	43.7		0.10	mg/L	07-OCT-18	10-OCT-18	R4270315
Manganese (Mn)-Dissolved	0.0518		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Molybdenum (Mo)-Dissolved	0.00280		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Nickel (Ni)-Dissolved	0.00101		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Potassium (K)-Dissolved	1.65		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Selenium (Se)-Dissolved	2.82		0.050	ug/L	07-OCT-18	10-OCT-18	R4270315
Silicon (Si)-Dissolved	4.57		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Sodium (Na)-Dissolved	4.94		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Strontium (Sr)-Dissolved	0.502		0.00020	mg/L	07-OCT-18	10-OCT-18	R4270315
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Uranium (U)-Dissolved	0.000689		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	07-OCT-18	10-OCT-18	R4270315

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-5 GH_POTW10_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 13:44							
Matrix: WG							
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	411		0.50	mg/L		11-OCT-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		10-OCT-18	R4270315
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		13-OCT-18	R4276568
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		10-OCT-18	R4270315
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		10-OCT-18	R4270315
Arsenic (As)-Total	0.00107		0.00010	mg/L		10-OCT-18	R4270315
Barium (Ba)-Total	0.0177		0.00010	mg/L		10-OCT-18	R4270315
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		10-OCT-18	R4270315
Boron (B)-Total	0.041		0.010	mg/L		10-OCT-18	R4270315
Cadmium (Cd)-Total	0.0105		0.0050	ug/L		10-OCT-18	R4270315
Calcium (Ca)-Total	89.5		0.050	mg/L		10-OCT-18	R4270315
Chromium (Cr)-Total	0.00014		0.00010	mg/L		10-OCT-18	R4270315
Cobalt (Co)-Total	0.15		0.10	ug/L		10-OCT-18	R4270315
Copper (Cu)-Total	<0.00050		0.00050	mg/L		10-OCT-18	R4270315
Iron (Fe)-Total	0.654		0.010	mg/L		10-OCT-18	R4270315
Lead (Pb)-Total	<0.000050		0.000050	mg/L		10-OCT-18	R4270315
Lithium (Li)-Total	0.0154		0.0010	mg/L		10-OCT-18	R4270315
Magnesium (Mg)-Total	43.8		0.10	mg/L		10-OCT-18	R4270315
Manganese (Mn)-Total	0.0506		0.00010	mg/L		10-OCT-18	R4270315
Molybdenum (Mo)-Total	0.00287		0.000050	mg/L		10-OCT-18	R4270315
Nickel (Ni)-Total	0.00101		0.00050	mg/L		10-OCT-18	R4270315
Potassium (K)-Total	1.58		0.050	mg/L		10-OCT-18	R4270315
Selenium (Se)-Total	2.74		0.050	ug/L		10-OCT-18	R4270315
Silicon (Si)-Total	4.57		0.10	mg/L		10-OCT-18	R4270315
Silver (Ag)-Total	<0.000010		0.000010	mg/L		10-OCT-18	R4270315
Sodium (Na)-Total	4.88		0.050	mg/L		10-OCT-18	R4270315
Strontium (Sr)-Total	0.492		0.00020	mg/L		10-OCT-18	R4270315
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		10-OCT-18	R4270315
Tin (Sn)-Total	<0.00010		0.00010	mg/L		10-OCT-18	R4270315
Titanium (Ti)-Total	<0.010		0.010	mg/L		10-OCT-18	R4270315
Uranium (U)-Total	0.000650		0.000010	mg/L		10-OCT-18	R4270315
Vanadium (V)-Total	<0.00050		0.00050	mg/L		10-OCT-18	R4270315
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		10-OCT-18	R4270315
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	6.0		2.0	mg/L		14-OCT-18	R4277935
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Hydroxide (as CaCO3)	212		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Total (as CaCO3)	212		1.0	mg/L		12-OCT-18	R4276037
Ammonia, Total (as N)							
Ammonia as N	0.0782		0.0050	mg/L		12-OCT-18	R4276013
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		05-OCT-18	R4263431
Chloride in Water by IC							
Chloride (Cl)	5.53		0.50	mg/L		05-OCT-18	R4263431
Electrical Conductivity (EC)							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-5 GH_POTW10_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 13:44							
Matrix: WG							
Electrical Conductivity (EC)							
Conductivity (@ 25C)	679		2.0	uS/cm		12-OCT-18	R4276037
Fluoride in Water by IC							
Fluoride (F)	0.847		0.020	mg/L		05-OCT-18	R4263431
Ion Balance Calculation							
Cation - Anion Balance	0.4			%		15-OCT-18	
Anion Sum	8.44			meq/L		15-OCT-18	
Cation Sum	8.50			meq/L		15-OCT-18	
Ion Balance Calculation							
Ion Balance	101		-100	%		15-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.369		0.0050	mg/L		05-OCT-18	R4263431
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.0109		0.0010	mg/L		05-OCT-18	R4263431
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		06-OCT-18	R4268789
Oxidation redution potential by elect.							
ORP	437		-1000	mV		11-OCT-18	R4276673
Phosphorus (P)-Total							
Phosphorus (P)-Total	<0.0020		0.0020	mg/L		11-OCT-18	R4271227
Sulfate in Water by IC							
Sulfate (SO4)	191		0.30	mg/L		05-OCT-18	R4263431
Total Dissolved Solids							
Total Dissolved Solids	504	DLHC	20	mg/L		11-OCT-18	R4275928
Total Suspended Solids							
Total Suspended Solids	2.0		1.0	mg/L		11-OCT-18	R4274975
Turbidity							
Turbidity	9.55		0.10	NTU		06-OCT-18	R4264647
pH							
pH	8.40		0.10	pH		12-OCT-18	R4276037
L2176772-6 GH_POTW15_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 13:47							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	0.66		0.50	mg/L		12-OCT-18	R4277188
Total Kjeldahl Nitrogen	0.129		0.050	mg/L		10-OCT-18	R4268769
Total Organic Carbon	0.90		0.50	mg/L		12-OCT-18	R4277188
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	07-OCT-18	10-OCT-18	R4270315
Dissolved Metals Filtration Location	FIELD					07-OCT-18	R4263749
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	07-OCT-18	11-OCT-18	R4269787
Dissolved Mercury Filtration Location	FIELD					07-OCT-18	R4263691
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					07-OCT-18	R4263749
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	07-OCT-18	10-OCT-18	R4270315
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Arsenic (As)-Dissolved	0.00163		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Barium (Ba)-Dissolved	0.0222		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Boron (B)-Dissolved	0.020		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-6 GH_POTW15_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 13:47							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Cadmium (Cd)-Dissolved	0.0133		0.0050	ug/L	07-OCT-18	10-OCT-18	R4270315
Calcium (Ca)-Dissolved	135		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Cobalt (Co)-Dissolved	0.22		0.10	ug/L	07-OCT-18	10-OCT-18	R4270315
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Iron (Fe)-Dissolved	0.883		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Lithium (Li)-Dissolved	0.0146		0.0010	mg/L	07-OCT-18	10-OCT-18	R4270315
Magnesium (Mg)-Dissolved	50.0		0.10	mg/L	07-OCT-18	10-OCT-18	R4270315
Manganese (Mn)-Dissolved	0.191		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Molybdenum (Mo)-Dissolved	0.00236		0.000050	mg/L	07-OCT-18	10-OCT-18	R4270315
Nickel (Ni)-Dissolved	0.00114		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Potassium (K)-Dissolved	1.66		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	07-OCT-18	10-OCT-18	R4270315
Silicon (Si)-Dissolved	4.22		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Sodium (Na)-Dissolved	12.0		0.050	mg/L	07-OCT-18	10-OCT-18	R4270315
Strontium (Sr)-Dissolved	0.384		0.00020	mg/L	07-OCT-18	10-OCT-18	R4270315
Thallium (Tl)-Dissolved	0.000017		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	07-OCT-18	10-OCT-18	R4270315
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	07-OCT-18	10-OCT-18	R4270315
Uranium (U)-Dissolved	0.00137		0.000010	mg/L	07-OCT-18	10-OCT-18	R4270315
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	07-OCT-18	10-OCT-18	R4270315
Zinc (Zn)-Dissolved	0.0013		0.0010	mg/L	07-OCT-18	10-OCT-18	R4270315
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	544		0.50	mg/L		11-OCT-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		10-OCT-18	R4270315
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		13-OCT-18	R4276568
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0046		0.0030	mg/L		10-OCT-18	R4270315
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		10-OCT-18	R4270315
Arsenic (As)-Total	0.00158		0.00010	mg/L		10-OCT-18	R4270315
Barium (Ba)-Total	0.0212		0.00010	mg/L		10-OCT-18	R4270315
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		10-OCT-18	R4270315
Boron (B)-Total	0.022		0.010	mg/L		10-OCT-18	R4270315
Cadmium (Cd)-Total	0.0113		0.0050	ug/L		10-OCT-18	R4270315
Calcium (Ca)-Total	129		0.050	mg/L		10-OCT-18	R4270315
Chromium (Cr)-Total	0.00013		0.00010	mg/L		10-OCT-18	R4270315
Cobalt (Co)-Total	0.23		0.10	ug/L		10-OCT-18	R4270315
Copper (Cu)-Total	<0.00050		0.00050	mg/L		10-OCT-18	R4270315
Iron (Fe)-Total	0.837		0.010	mg/L		10-OCT-18	R4270315
Lead (Pb)-Total	<0.000050		0.000050	mg/L		10-OCT-18	R4270315
Lithium (Li)-Total	0.0142		0.0010	mg/L		10-OCT-18	R4270315
Magnesium (Mg)-Total	47.9		0.10	mg/L		10-OCT-18	R4270315
Manganese (Mn)-Total	0.179		0.00010	mg/L		10-OCT-18	R4270315
Molybdenum (Mo)-Total	0.00235		0.000050	mg/L		10-OCT-18	R4270315
Nickel (Ni)-Total	0.00116		0.00050	mg/L		10-OCT-18	R4270315
Potassium (K)-Total	1.51		0.050	mg/L		10-OCT-18	R4270315
Selenium (Se)-Total	<0.050		0.050	ug/L		10-OCT-18	R4270315

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-6 GH_POTW15_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 13:47							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Silicon (Si)-Total	4.11		0.10	mg/L		10-OCT-18	R4270315
Silver (Ag)-Total	<0.000010		0.000010	mg/L		10-OCT-18	R4270315
Sodium (Na)-Total	11.4		0.050	mg/L		10-OCT-18	R4270315
Strontium (Sr)-Total	0.367		0.00020	mg/L		10-OCT-18	R4270315
Thallium (Tl)-Total	0.000016		0.000010	mg/L		10-OCT-18	R4270315
Tin (Sn)-Total	<0.00010		0.00010	mg/L		10-OCT-18	R4270315
Titanium (Ti)-Total	<0.010		0.010	mg/L		10-OCT-18	R4270315
Uranium (U)-Total	0.00131		0.000010	mg/L		10-OCT-18	R4270315
Vanadium (V)-Total	<0.00050		0.00050	mg/L		10-OCT-18	R4270315
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		10-OCT-18	R4270315
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	4.0		2.0	mg/L		14-OCT-18	R4277935
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	223		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Total (as CaCO3)	223		1.0	mg/L		12-OCT-18	R4276037
Ammonia, Total (as N)							
Ammonia as N	0.0608		0.0050	mg/L		12-OCT-18	R4276013
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLHC	0.25	mg/L		05-OCT-18	R4263431
Chloride in Water by IC							
Chloride (Cl)	29.9	DLHC	2.5	mg/L		05-OCT-18	R4263431
Electrical Conductivity (EC)							
Conductivity (@ 25C)	821		2.0	uS/cm		12-OCT-18	R4276037
Fluoride in Water by IC							
Fluoride (F)	0.23	DLHC	0.10	mg/L		05-OCT-18	R4263431
Ion Balance Calculation							
Ion Balance	104		-100	%		15-OCT-18	
Ion Balance Calculation							
Cation - Anion Balance	2.0			%		15-OCT-18	
Anion Sum	11.0			meq/L		15-OCT-18	
Cation Sum	11.5			meq/L		15-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.043	DLHC	0.025	mg/L		05-OCT-18	R4263431
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0050	DLHC	0.0050	mg/L		05-OCT-18	R4263431
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		06-OCT-18	R4268789
Oxidation redution potential by elect.							
ORP	303		-1000	mV		11-OCT-18	R4276673
Phosphorus (P)-Total							
Phosphorus (P)-Total	<0.0020		0.0020	mg/L		11-OCT-18	R4271227
Sulfate in Water by IC							
Sulfate (SO4)	275	DLHC	1.5	mg/L		05-OCT-18	R4263431
Total Dissolved Solids							
Total Dissolved Solids	634	DLHC	20	mg/L		11-OCT-18	R4275928
Total Suspended Solids							
Total Suspended Solids	2.7		1.0	mg/L		11-OCT-18	R4274975
Turbidity							
Turbidity	11.8		0.10	NTU		06-OCT-18	R4264647

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-6 GH_POTW15_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 13:47							
Matrix: WG							
pH							
pH	8.21		0.10	pH		12-OCT-18	R4276037
L2176772-7 GH_GHLRP1_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 10:30							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	<0.50		0.50	mg/L		12-OCT-18	R4277188
Total Kjeldahl Nitrogen	0.176		0.050	mg/L		10-OCT-18	R4268769
Total Organic Carbon	<0.50		0.50	mg/L		12-OCT-18	R4277188
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	07-OCT-18	11-OCT-18	R4269787
Dissolved Mercury Filtration Location	FIELD					07-OCT-18	R4263691
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	<0.50		0.50	mg/L		15-OCT-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		10-OCT-18	R4270315
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		13-OCT-18	R4276568
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		10-OCT-18	R4270315
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		10-OCT-18	R4270315
Arsenic (As)-Total	<0.00010		0.00010	mg/L		10-OCT-18	R4270315
Barium (Ba)-Total	<0.00010		0.00010	mg/L		10-OCT-18	R4270315
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		10-OCT-18	R4270315
Boron (B)-Total	<0.010		0.010	mg/L		10-OCT-18	R4270315
Cadmium (Cd)-Total	<0.0050		0.0050	ug/L		10-OCT-18	R4270315
Calcium (Ca)-Total	<0.050		0.050	mg/L		10-OCT-18	R4270315
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		10-OCT-18	R4270315
Cobalt (Co)-Total	<0.10		0.10	ug/L		10-OCT-18	R4270315
Copper (Cu)-Total	<0.00050		0.00050	mg/L		10-OCT-18	R4270315
Iron (Fe)-Total	<0.010		0.010	mg/L		10-OCT-18	R4270315
Lead (Pb)-Total	<0.000050		0.000050	mg/L		10-OCT-18	R4270315
Lithium (Li)-Total	<0.0010		0.0010	mg/L		10-OCT-18	R4270315
Magnesium (Mg)-Total	<0.10		0.10	mg/L		10-OCT-18	R4270315
Manganese (Mn)-Total	<0.00010		0.00010	mg/L		10-OCT-18	R4270315
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L		10-OCT-18	R4270315
Nickel (Ni)-Total	<0.00050		0.00050	mg/L		10-OCT-18	R4270315
Potassium (K)-Total	<0.050		0.050	mg/L		10-OCT-18	R4270315
Selenium (Se)-Total	<0.050		0.050	ug/L		10-OCT-18	R4270315
Silicon (Si)-Total	<0.10		0.10	mg/L		10-OCT-18	R4270315
Silver (Ag)-Total	<0.000010		0.000010	mg/L		10-OCT-18	R4270315
Sodium (Na)-Total	<0.050		0.050	mg/L		10-OCT-18	R4270315
Strontium (Sr)-Total	<0.00020		0.00020	mg/L		10-OCT-18	R4270315
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		10-OCT-18	R4270315
Tin (Sn)-Total	<0.00010		0.00010	mg/L		10-OCT-18	R4270315
Titanium (Ti)-Total	<0.010		0.010	mg/L		10-OCT-18	R4270315
Uranium (U)-Total	<0.000010		0.000010	mg/L		10-OCT-18	R4270315
Vanadium (V)-Total	<0.00050		0.00050	mg/L		10-OCT-18	R4270315
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		10-OCT-18	R4270315
Routine for Teck Coal							
Acidity by Automatic Titration							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2176772-7 GH_GHLRP1_WG_2018-10-01_NP							
Sampled By: CLIENT on 04-OCT-18 @ 10:30							
Matrix: WG							
Acidity by Automatic Titration							
Acidity (as CaCO3)	2.4		2.0	mg/L		13-OCT-18	R4277566
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Alkalinity, Total (as CaCO3)	<1.0		1.0	mg/L		12-OCT-18	R4276037
Ammonia, Total (as N)							
Ammonia as N	0.0261		0.0050	mg/L		12-OCT-18	R4276013
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		05-OCT-18	R4263431
Chloride in Water by IC							
Chloride (Cl)	<0.50		0.50	mg/L		05-OCT-18	R4263431
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	LAB					14-OCT-18	R4277673
Calcium (Ca)-Dissolved	<0.050		0.050	mg/L		14-OCT-18	R4277727
Magnesium (Mg)-Dissolved	<0.0050		0.0050	mg/L		14-OCT-18	R4277727
Potassium (K)-Dissolved	<0.050		0.050	mg/L		14-OCT-18	R4277727
Sodium (Na)-Dissolved	<0.050		0.050	mg/L		14-OCT-18	R4277727
Electrical Conductivity (EC)							
Conductivity (@ 25C)	<2.0		2.0	uS/cm		12-OCT-18	R4276037
Fluoride in Water by IC							
Fluoride (F)	<0.020		0.020	mg/L		05-OCT-18	R4263431
Ion Balance Calculation							
Cation - Anion Balance	0.0			%		15-OCT-18	
Anion Sum	<0.10			meq/L		15-OCT-18	
Cation Sum	<0.10			meq/L		15-OCT-18	
Ion Balance Calculation							
Ion Balance	0.0		-100	%		15-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	<0.0050		0.0050	mg/L		05-OCT-18	R4263431
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0010		0.0010	mg/L		05-OCT-18	R4263431
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		06-OCT-18	R4268789
Oxidation redution potential by elect.							
ORP	476		-1000	mV		11-OCT-18	R4276673
Phosphorus (P)-Total							
Phosphorus (P)-Total	<0.0020		0.0020	mg/L		11-OCT-18	R4271227
Sulfate in Water by IC							
Sulfate (SO4)	<0.30		0.30	mg/L		05-OCT-18	R4263431
Total Dissolved Solids							
Total Dissolved Solids	<10		10	mg/L		11-OCT-18	R4275928
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		11-OCT-18	R4274975
Turbidity							
Turbidity	<0.10		0.10	NTU		06-OCT-18	R4264647
pH							
pH	5.62		0.10	pH		12-OCT-18	R4276037

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Numbe	Client ID	Qualifier	Description
L2176772-2	GH_GA-MW-2_WG_2018-10	WSMD	DISSOLVED HG VIAL BROKEN - RUN FROM DISSOLVED METALS - Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

Sample Parameter Qualifier Key:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-CL	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

QTR_WG_2018-10-01

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TECK COAL LIMITED (GREENHILLS)
BOX 5000
ELKFORD BC V0B1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4277566								
WG2903183-27 DUP		**L2176772-7**						
Acidity (as CaCO3)		2.4	2.5		mg/L	6.5	20	13-OCT-18
WG2903183-26 LCS								
Acidity (as CaCO3)			104.3		%		85-115	13-OCT-18
WG2903183-25 MB								
Acidity (as CaCO3)			<2.0		mg/L		4	13-OCT-18
Batch R4277935								
WG2903592-12 DUP		**L2176772-2**						
Acidity (as CaCO3)		5.4	4.7		mg/L	13	20	14-OCT-18
WG2903592-2 LCS								
Acidity (as CaCO3)			96.4		%		85-115	14-OCT-18
WG2903592-5 LCS								
Acidity (as CaCO3)			101.7		%		85-115	14-OCT-18
WG2903592-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		4	14-OCT-18
WG2903592-4 MB								
Acidity (as CaCO3)			<2.0		mg/L		4	14-OCT-18
ALK-MAN-CL	**Water**							
Batch R4275292								
WG2902140-2 LCS								
Alkalinity, Total (as CaCO3)			105.9		%		85-115	11-OCT-18
WG2902140-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	11-OCT-18
Batch R4276037								
WG2902400-14 LCS								
Alkalinity, Total (as CaCO3)			108.0		%		85-115	12-OCT-18
WG2902400-13 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	12-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4270315								
WG2897723-3 DUP		**L2176772-2**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	10-OCT-18
WG2897723-2 LCS								
Beryllium (Be)-Dissolved			98.0		%		80-120	10-OCT-18
WG2897723-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	10-OCT-18
WG2897723-4 MS		**L2176772-1**						
Beryllium (Be)-Dissolved			97.1		%		70-130	10-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BE-T-L-CCMS-VA	**Water**							
Batch R4270315								
WG2897690-2 LCS								
Beryllium (Be)-Total			96.8		%		80-120	10-OCT-18
WG2897690-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	10-OCT-18
BR-L-IC-N-CL	**Water**							
Batch R4263431								
WG2897406-11 DUP		**L2176772-5**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	05-OCT-18
WG2897406-10 LCS								
Bromide (Br)			102.3		%		85-115	05-OCT-18
WG2897406-6 LCS								
Bromide (Br)			102.8		%		85-115	05-OCT-18
WG2897406-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	05-OCT-18
WG2897406-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	05-OCT-18
WG2897406-12 MS		**L2176772-5**						
Bromide (Br)			121.1		%		75-125	05-OCT-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4277188								
WG2902914-6 LCS								
Dissolved Organic Carbon			106.6		%		80-120	12-OCT-18
WG2902914-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	12-OCT-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4277188								
WG2902914-6 LCS								
Total Organic Carbon			106.8		%		80-120	12-OCT-18
WG2902914-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	12-OCT-18
CL-IC-N-CL	**Water**							
Batch R4263431								
WG2897406-11 DUP		**L2176772-5**						
Chloride (Cl)		5.53	5.50		mg/L	0.6	20	05-OCT-18
WG2897406-10 LCS								
Chloride (Cl)			102.3		%		90-110	05-OCT-18
WG2897406-6 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-CL	**Water**							
Batch R4263431								
WG2897406-6 LCS								
Chloride (Cl)			102.2		%		90-110	05-OCT-18
WG2897406-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	05-OCT-18
WG2897406-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	05-OCT-18
WG2897406-12 MS		**L2176772-5**						
Chloride (Cl)			123.2		%		75-125	05-OCT-18
EC-L-PCT-CL	**Water**							
Batch R4275292								
WG2902140-2 LCS								
Conductivity (@ 25C)			99.3		%		90-110	11-OCT-18
WG2902140-1 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	11-OCT-18
Batch R4276037								
WG2902400-14 LCS								
Conductivity (@ 25C)			97.1		%		90-110	12-OCT-18
WG2902400-13 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	12-OCT-18
F-IC-N-CL	**Water**							
Batch R4263431								
WG2897406-11 DUP		**L2176772-5**						
Fluoride (F)		0.847	0.845		mg/L	0.3	20	05-OCT-18
WG2897406-10 LCS								
Fluoride (F)			108.3		%		90-110	05-OCT-18
WG2897406-6 LCS								
Fluoride (F)			108.4		%		90-110	05-OCT-18
WG2897406-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	05-OCT-18
WG2897406-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	05-OCT-18
WG2897406-12 MS		**L2176772-5**						
Fluoride (F)			124.6		%		75-125	05-OCT-18
HG-D-CVAA-VA	**Water**							
Batch R4269787								
WG2897641-2 LCS								
Mercury (Hg)-Dissolved			94.4		%		80-120	11-OCT-18
WG2897641-1 MB		**NP**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R4269787								
WG2897641-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	11-OCT-18
Batch R4273149								
WG2900484-3 DUP		**L2176772-2**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	11-OCT-18
WG2900484-2 LCS								
Mercury (Hg)-Dissolved			99.6		%		80-120	11-OCT-18
WG2900484-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	11-OCT-18
HG-T-CVAA-VA	**Water**							
Batch R4276568								
WG2902746-2 LCS								
Mercury (Hg)-Total			99.6		%		80-120	13-OCT-18
WG2902746-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	13-OCT-18
MET-D-CCMS-CL	**Water**							
Batch R4277727								
WG2903548-2 LCS		**TMRM**						
Calcium (Ca)-Dissolved			92.6		%		80-120	14-OCT-18
Magnesium (Mg)-Dissolved			95.1		%		80-120	14-OCT-18
Potassium (K)-Dissolved			98.2		%		80-120	14-OCT-18
Sodium (Na)-Dissolved			96.7		%		80-120	14-OCT-18
WG2903548-6 LCS		**TMRM**						
Calcium (Ca)-Dissolved			89.9		%		80-120	14-OCT-18
Magnesium (Mg)-Dissolved			81.0		%		80-120	14-OCT-18
Potassium (K)-Dissolved			96.3		%		80-120	14-OCT-18
Sodium (Na)-Dissolved			93.4		%		80-120	14-OCT-18
WG2903548-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	14-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	14-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	14-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	14-OCT-18
WG2903548-5 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	14-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	14-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	14-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R4277727								
WG2903548-5 MB								
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	14-OCT-18
MET-D-CCMS-VA	**Water**							
Batch R4270315								
WG2897723-3 DUP		**L2176772-2**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	10-OCT-18
Antimony (Sb)-Dissolved		0.00196	0.00199		mg/L	1.7	20	10-OCT-18
Arsenic (As)-Dissolved		0.00028	0.00028		mg/L	2.5	20	10-OCT-18
Barium (Ba)-Dissolved		0.0592	0.0604		mg/L	2.0	20	10-OCT-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	10-OCT-18
Boron (B)-Dissolved		0.020	0.020		mg/L	0.1	20	10-OCT-18
Cadmium (Cd)-Dissolved		<0.000075	<0.000075	RPD-NA	mg/L	N/A	20	10-OCT-18
Calcium (Ca)-Dissolved		135	142		mg/L	5.2	20	10-OCT-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	10-OCT-18
Cobalt (Co)-Dissolved		0.00035	0.00037		mg/L	7.8	20	10-OCT-18
Copper (Cu)-Dissolved		0.00390	0.00403		mg/L	3.2	20	10-OCT-18
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	10-OCT-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	10-OCT-18
Lithium (Li)-Dissolved		0.0165	0.0171		mg/L	3.7	20	10-OCT-18
Magnesium (Mg)-Dissolved		39.1	41.5		mg/L	6.0	20	10-OCT-18
Manganese (Mn)-Dissolved		0.0711	0.0756		mg/L	6.2	20	10-OCT-18
Molybdenum (Mo)-Dissolved		0.0630	0.0638		mg/L	1.2	20	10-OCT-18
Nickel (Ni)-Dissolved		0.00704	0.00722		mg/L	2.5	20	10-OCT-18
Potassium (K)-Dissolved		1.21	1.29		mg/L	6.6	20	10-OCT-18
Selenium (Se)-Dissolved		0.0128	0.0126		mg/L	0.9	20	10-OCT-18
Silicon (Si)-Dissolved		3.45	3.52		mg/L	1.9	20	10-OCT-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	10-OCT-18
Sodium (Na)-Dissolved		9.53	9.59		mg/L	0.6	20	10-OCT-18
Strontium (Sr)-Dissolved		0.535	0.574		mg/L	6.9	20	10-OCT-18
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	10-OCT-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	10-OCT-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	10-OCT-18
Uranium (U)-Dissolved		0.00628	0.00622		mg/L	1.1	20	10-OCT-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	10-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4270315								
WG2897723-3 DUP		**L2176772-2**						
Zinc (Zn)-Dissolved		0.0091	0.0097		mg/L	5.8	20	10-OCT-18
WG2897723-2 LCS								
Aluminum (Al)-Dissolved			103.7		%		80-120	10-OCT-18
Antimony (Sb)-Dissolved			97.8		%		80-120	10-OCT-18
Arsenic (As)-Dissolved			100.8		%		80-120	10-OCT-18
Barium (Ba)-Dissolved			98.3		%		80-120	10-OCT-18
Bismuth (Bi)-Dissolved			100.5		%		80-120	10-OCT-18
Boron (B)-Dissolved			95.0		%		80-120	10-OCT-18
Cadmium (Cd)-Dissolved			101.6		%		80-120	10-OCT-18
Calcium (Ca)-Dissolved			99.6		%		80-120	10-OCT-18
Chromium (Cr)-Dissolved			103.8		%		80-120	10-OCT-18
Cobalt (Co)-Dissolved			101.0		%		80-120	10-OCT-18
Copper (Cu)-Dissolved			99.2		%		80-120	10-OCT-18
Iron (Fe)-Dissolved			94.9		%		80-120	10-OCT-18
Lead (Pb)-Dissolved			100.1		%		80-120	10-OCT-18
Lithium (Li)-Dissolved			96.4		%		80-120	10-OCT-18
Magnesium (Mg)-Dissolved			104.7		%		80-120	10-OCT-18
Manganese (Mn)-Dissolved			97.8		%		80-120	10-OCT-18
Molybdenum (Mo)-Dissolved			97.7		%		80-120	10-OCT-18
Nickel (Ni)-Dissolved			99.8		%		80-120	10-OCT-18
Potassium (K)-Dissolved			101.6		%		80-120	10-OCT-18
Selenium (Se)-Dissolved			95.6		%		80-120	10-OCT-18
Silicon (Si)-Dissolved			95.8		%		60-140	10-OCT-18
Silver (Ag)-Dissolved			95.3		%		80-120	10-OCT-18
Sodium (Na)-Dissolved			105.7		%		80-120	10-OCT-18
Strontium (Sr)-Dissolved			92.4		%		80-120	10-OCT-18
Thallium (Tl)-Dissolved			101.1		%		80-120	10-OCT-18
Tin (Sn)-Dissolved			95.9		%		80-120	10-OCT-18
Titanium (Ti)-Dissolved			93.8		%		80-120	10-OCT-18
Uranium (U)-Dissolved			101.1		%		80-120	10-OCT-18
Vanadium (V)-Dissolved			102.0		%		80-120	10-OCT-18
Zinc (Zn)-Dissolved			97.7		%		80-120	10-OCT-18
WG2897723-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	10-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	10-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4270315								
WG2897723-1 MB		**NP**						
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	10-OCT-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	10-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	10-OCT-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	10-OCT-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	10-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	10-OCT-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	10-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	10-OCT-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	10-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	10-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	10-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	10-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	10-OCT-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	10-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	10-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	10-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	10-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	10-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	10-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	10-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	10-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	10-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	10-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	10-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	10-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	10-OCT-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	10-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	10-OCT-18
WG2897723-4 MS		**L2176772-1**						
Aluminum (Al)-Dissolved			101.1		%		70-130	10-OCT-18
Antimony (Sb)-Dissolved			96.8		%		70-130	10-OCT-18
Arsenic (As)-Dissolved			103.5		%		70-130	10-OCT-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	10-OCT-18
Bismuth (Bi)-Dissolved			85.1		%		70-130	10-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4270315								
WG2897723-4 MS		**L2176772-1**						
Boron (B)-Dissolved			N/A	MS-B	%		-	10-OCT-18
Cadmium (Cd)-Dissolved			98.3		%		70-130	10-OCT-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	10-OCT-18
Chromium (Cr)-Dissolved			97.5		%		70-130	10-OCT-18
Cobalt (Co)-Dissolved			95.5		%		70-130	10-OCT-18
Copper (Cu)-Dissolved			N/A	MS-B	%		-	10-OCT-18
Iron (Fe)-Dissolved			92.5		%		70-130	10-OCT-18
Lead (Pb)-Dissolved			90.8		%		70-130	10-OCT-18
Lithium (Li)-Dissolved			N/A	MS-B	%		-	10-OCT-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	10-OCT-18
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	10-OCT-18
Molybdenum (Mo)-Dissolved			96.2		%		70-130	10-OCT-18
Nickel (Ni)-Dissolved			92.6		%		70-130	10-OCT-18
Potassium (K)-Dissolved			93.5		%		70-130	10-OCT-18
Selenium (Se)-Dissolved			98.6		%		70-130	10-OCT-18
Silicon (Si)-Dissolved			91.3		%		70-130	10-OCT-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	10-OCT-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	10-OCT-18
Thallium (Tl)-Dissolved			89.0		%		70-130	10-OCT-18
Tin (Sn)-Dissolved			97.1		%		70-130	10-OCT-18
Titanium (Ti)-Dissolved			94.3		%		70-130	10-OCT-18
Uranium (U)-Dissolved			91.3		%		70-130	10-OCT-18
Vanadium (V)-Dissolved			100.7		%		70-130	10-OCT-18
Zinc (Zn)-Dissolved			93.5		%		70-130	10-OCT-18
MET-T-CCMS-VA	**Water**							
Batch R4270315								
WG2897690-2 LCS								
Aluminum (Al)-Total			97.9		%		80-120	10-OCT-18
Antimony (Sb)-Total			99.5		%		80-120	10-OCT-18
Arsenic (As)-Total			95.4		%		80-120	10-OCT-18
Barium (Ba)-Total			95.8		%		80-120	10-OCT-18
Bismuth (Bi)-Total			96.9		%		80-120	10-OCT-18
Boron (B)-Total			93.5		%		80-120	10-OCT-18
Cadmium (Cd)-Total			98.5		%		80-120	10-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4270315								
WG2897690-2 LCS								
Calcium (Ca)-Total			97.4		%		80-120	10-OCT-18
Chromium (Cr)-Total			94.5		%		80-120	10-OCT-18
Cobalt (Co)-Total			95.0		%		80-120	10-OCT-18
Copper (Cu)-Total			94.1		%		80-120	10-OCT-18
Iron (Fe)-Total			92.8		%		80-120	10-OCT-18
Lead (Pb)-Total			92.1		%		80-120	10-OCT-18
Lithium (Li)-Total			95.5		%		80-120	10-OCT-18
Magnesium (Mg)-Total			95.6		%		80-120	10-OCT-18
Manganese (Mn)-Total			92.1		%		80-120	10-OCT-18
Molybdenum (Mo)-Total			98.3		%		80-120	10-OCT-18
Nickel (Ni)-Total			95.2		%		80-120	10-OCT-18
Potassium (K)-Total			97.6		%		80-120	10-OCT-18
Selenium (Se)-Total			97.2		%		80-120	10-OCT-18
Silicon (Si)-Total			97.0		%		80-120	10-OCT-18
Silver (Ag)-Total			93.8		%		80-120	10-OCT-18
Sodium (Na)-Total			100.5		%		80-120	10-OCT-18
Strontium (Sr)-Total			91.2		%		80-120	10-OCT-18
Thallium (Tl)-Total			94.4		%		80-120	10-OCT-18
Tin (Sn)-Total			93.0		%		80-120	10-OCT-18
Titanium (Ti)-Total			91.4		%		80-120	10-OCT-18
Uranium (U)-Total			93.2		%		80-120	10-OCT-18
Vanadium (V)-Total			95.6		%		80-120	10-OCT-18
Zinc (Zn)-Total			93.5		%		80-120	10-OCT-18
WG2897690-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	10-OCT-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	10-OCT-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	10-OCT-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	10-OCT-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	10-OCT-18
Boron (B)-Total			<0.010		mg/L		0.01	10-OCT-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	10-OCT-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	10-OCT-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	10-OCT-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	10-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4270315								
WG2897690-1 MB								
Copper (Cu)-Total			<0.00050		mg/L		0.0005	10-OCT-18
Iron (Fe)-Total			<0.010		mg/L		0.01	10-OCT-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	10-OCT-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	10-OCT-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	10-OCT-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	10-OCT-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	10-OCT-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	10-OCT-18
Potassium (K)-Total			<0.050		mg/L		0.05	10-OCT-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	10-OCT-18
Silicon (Si)-Total			<0.10		mg/L		0.1	10-OCT-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	10-OCT-18
Sodium (Na)-Total			<0.050		mg/L		0.05	10-OCT-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	10-OCT-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	10-OCT-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	10-OCT-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	10-OCT-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	10-OCT-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	10-OCT-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	10-OCT-18
NH3-L-F-CL	**Water**							
Batch R4276013								
WG2902406-12 DUP		**L2176772-7**						
Ammonia as N		0.0261	0.0231		mg/L	12	20	12-OCT-18
WG2902406-10 LCS								
Ammonia as N			101.6		%		85-115	12-OCT-18
WG2902406-6 LCS								
Ammonia as N			99.6		%		85-115	12-OCT-18
WG2902406-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	12-OCT-18
WG2902406-9 MB								
Ammonia as N			<0.0050		mg/L		0.005	12-OCT-18
WG2902406-11 MS		**L2176772-7**						
Ammonia as N			102.3		%		75-125	12-OCT-18
NO2-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-CL	**Water**							
Batch R4263431								
WG2897406-11 DUP		**L2176772-5**						
Nitrite (as N)		0.0109	0.0110		mg/L	0.9	20	05-OCT-18
WG2897406-10 LCS								
Nitrite (as N)			106.6		%		90-110	05-OCT-18
WG2897406-6 LCS								
Nitrite (as N)			106.1		%		90-110	05-OCT-18
WG2897406-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	05-OCT-18
WG2897406-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	05-OCT-18
WG2897406-12 MS		**L2176772-5**						
Nitrite (as N)			123.8		%		75-125	05-OCT-18
NO3-L-IC-N-CL	**Water**							
Batch R4263431								
WG2897406-11 DUP		**L2176772-5**						
Nitrate (as N)		0.369	0.364		mg/L	1.2	20	05-OCT-18
WG2897406-10 LCS								
Nitrate (as N)			103.9		%		90-110	05-OCT-18
WG2897406-6 LCS								
Nitrate (as N)			103.6		%		90-110	05-OCT-18
WG2897406-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	05-OCT-18
WG2897406-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	05-OCT-18
WG2897406-12 MS		**L2176772-5**						
Nitrate (as N)			124.0		%		75-125	05-OCT-18
ORP-CL	**Water**							
Batch R4276673								
WG2901190-7 CRM		**CL-ORP**						
ORP			215		mV		210-230	11-OCT-18
WG2901190-8 CRM		**CL-ORP**						
ORP			214		mV		210-230	11-OCT-18
WG2901190-9 DUP		**L2176772-3**						
ORP		397	405	J	mV	7.3	15	11-OCT-18
P-T-L-COL-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-CL	**Water**							
Batch R4271227								
WG2900859-6 LCS								
Phosphorus (P)-Total			103.7		%		80-120	11-OCT-18
WG2900859-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	11-OCT-18
PH-CL	**Water**							
Batch R4275292								
WG2902140-2 LCS								
pH			7.00		pH		6.9-7.1	11-OCT-18
Batch R4276037								
WG2902400-14 LCS								
pH			7.01		pH		6.9-7.1	12-OCT-18
PO4-DO-L-COL-CL	**Water**							
Batch R4268789								
WG2897472-2 LCS								
Orthophosphate-Dissolved (as P)			90.7		%		80-120	07-OCT-18
WG2897472-6 LCS								
Orthophosphate-Dissolved (as P)			101.5		%		80-120	06-OCT-18
WG2897472-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	07-OCT-18
WG2897472-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	06-OCT-18
SO4-IC-N-CL	**Water**							
Batch R4263431								
WG2897406-11 DUP		**L2176772-5**						
Sulfate (SO4)		191	191		mg/L	0.1	20	05-OCT-18
WG2897406-10 LCS								
Sulfate (SO4)			102.3		%		90-110	05-OCT-18
WG2897406-6 LCS								
Sulfate (SO4)			102.2		%		90-110	05-OCT-18
WG2897406-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	05-OCT-18
WG2897406-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	05-OCT-18
WG2897406-12 MS		**L2176772-5**						
Sulfate (SO4)			N/A	MS-B	%		-	05-OCT-18
SOLIDS-TDS-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-CL	**Water**							
Batch R4275928								
WG2900542-2 LCS								
Total Dissolved Solids			101.4		%		85-115	11-OCT-18
WG2900542-1 MB								
Total Dissolved Solids			<10		mg/L		10	11-OCT-18
TKN-L-F-CL	**Water**							
Batch R4268769								
WG2897769-10 LCS								
Total Kjeldahl Nitrogen			107.1		%		75-125	10-OCT-18
WG2897769-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	10-OCT-18
TSS-L-CL	**Water**							
Batch R4274975								
WG2900612-6 LCS								
Total Suspended Solids			93.9		%		85-115	11-OCT-18
WG2900612-5 MB								
Total Suspended Solids			<1.0		mg/L		1	11-OCT-18
TURBIDITY-CL	**Water**							
Batch R4264647								
WG2897300-15 DUP		**L2176772-6**						
Turbidity		11.8	11.6		NTU	1.7	15	06-OCT-18
WG2897300-11 LCS								
Turbidity			98.5		%		85-115	06-OCT-18
WG2897300-14 LCS								
Turbidity			97.0		%		85-115	06-OCT-18
WG2897300-10 MB								
Turbidity			<0.10		NTU		0.1	06-OCT-18
WG2897300-13 MB								
Turbidity			<0.10		NTU		0.1	06-OCT-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	04-OCT-18 10:30	11-OCT-18 17:00	0.25	174	hours	EHTR-FM
	2	04-OCT-18 12:55	11-OCT-18 17:00	0.25	172	hours	EHTR-FM
	3	04-OCT-18 11:35	11-OCT-18 17:00	0.25	174	hours	EHTR-FM
	4	04-OCT-18 10:30	11-OCT-18 17:00	0.25	174	hours	EHTR-FM
	5	04-OCT-18 13:44	11-OCT-18 17:00	0.25	171	hours	EHTR-FM
	6	04-OCT-18 13:47	11-OCT-18 17:00	0.25	171	hours	EHTR-FM
	7	04-OCT-18 10:30	11-OCT-18 17:00	0.25	174	hours	EHTR-FM
pH							
	1	04-OCT-18 10:30	11-OCT-18 00:00	0.25	157	hours	EHTR-FM
	2	04-OCT-18 12:55	12-OCT-18 12:00	0.25	191	hours	EHTR-FM
	3	04-OCT-18 11:35	12-OCT-18 12:00	0.25	192	hours	EHTR-FM
	4	04-OCT-18 10:30	12-OCT-18 12:00	0.25	193	hours	EHTR-FM
	5	04-OCT-18 13:44	12-OCT-18 12:00	0.25	190	hours	EHTR-FM
	6	04-OCT-18 13:47	12-OCT-18 12:00	0.25	190	hours	EHTR-FM
	7	04-OCT-18 10:30	12-OCT-18 12:00	0.25	193	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2176772 were received on 05-OCT-18 09:25.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	QTR_WG_2018-10-01	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Greenhills Operation			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jeremy Enns			Lab Contact	Lyudmyla Shvets			Email 1:				
Email	Jeremy.Enns@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:				
Address	P.O. BOX 5000			Address	2559 29 Street NE			Email 3:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B1H0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada					
Phone Number	250-865-3341			Phone Number	403 407 1794							

L2176772-COFC

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys loc code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC (Filtered Y, H2SO4)	ALS_Package-TKN/TOC (Filtered N, H2SO4)	HG-D-CVAF-VA (Filtered Y, HCL)	HG-T-CVAF-VA (Filtered N, HCL)	TECKCOAL-MET-D-VA (Filtered Y, HNO3)	TECKCOAL-ROUTINE-VA (Filtered N, NONE)	TECKCOAL-MET-T-VA (Filtered N, HNO3)
GH_GA-MW-1_WG_2018-10-01_NP	GH_GA-MW-1	WG		4-Oct	10:30	G	6	1	1	1	1	1	1	
GH_GA-MW-2_WG_2018-10-01_NP	GH_GA-MW-2	WG		4-Oct	12:55	G	6	1	1	1	1	1	1	broken HG-D vial
~~GH_GA-MW-3_WG_2018-10-01_NP~~	~~GH_GA-MW-3~~	~~WG~~		~~4-Oct~~		~~G~~	~~6~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	
GH_GA-MW-4_WG_2018-10-01_NP	GH_GA-MW-4	WG		4-Oct	11:35	G	6	1	1	1	1	1	1	
GH_GHER1_WG_2018-10-01_NP	GH_GHER1	WG		4-Oct	10:30	G	6	1	1	1	1		1	1
GH_POTW10_WG_2018-10-01_NP	GH_POTW10	WG		4-Oct	13:44	G	7	1	1	1	1	1	1	1
GH_POTW15_WG_2018-10-01_NP	GH_POTW15	WG		4-Oct	13:47	G	7	1	1	1	1	1	1	1
GH_GHLRP1_WG_2018-10-01_NP	GH_GHLRP1	WG		4-Oct	10:30	G	6	1	1	1	1		1	1

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Kirsten Campbell	Oct. 4/2018		10:50

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
BOX 5000
ELKFORD BC V0B1H0

Date Received: 17-OCT-18
Report Date: 24-OCT-18 16:58 (MT)
Version: FINAL

Client Phone: 250-865-3305

Certificate of Analysis

Lab Work Order #: L2182357

Project P.O. #: VPO00540380
Job Reference: GREENHILLS OPERATIONS
C of C Numbers: QTR_WG_2018-10-01
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-1 GH_POTW09_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:45							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	1.23	RRV	0.50	mg/L		23-OCT-18	R4297167
Total Kjeldahl Nitrogen	0.210		0.050	mg/L		19-OCT-18	R4289276
Total Organic Carbon	0.60	RRV	0.50	mg/L		23-OCT-18	R4297167
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	19-OCT-18	19-OCT-18	R4289319
Dissolved Metals Filtration Location	FIELD					19-OCT-18	R4287623
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	19-OCT-18	21-OCT-18	R4290008
Dissolved Mercury Filtration Location	FIELD					19-OCT-18	R4287554
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					19-OCT-18	R4287623
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	19-OCT-18	19-OCT-18	R4289319
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Arsenic (As)-Dissolved	0.00048		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Barium (Ba)-Dissolved	0.0349		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	19-OCT-18	19-OCT-18	R4289319
Boron (B)-Dissolved	0.019		0.010	mg/L	19-OCT-18	19-OCT-18	R4289319
Cadmium (Cd)-Dissolved	0.0114		0.0050	ug/L	19-OCT-18	19-OCT-18	R4289319
Calcium (Ca)-Dissolved	96.5		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Cobalt (Co)-Dissolved	0.18		0.10	ug/L	19-OCT-18	19-OCT-18	R4289319
Copper (Cu)-Dissolved	0.00294		0.00050	mg/L	19-OCT-18	19-OCT-18	R4289319
Iron (Fe)-Dissolved	0.150		0.010	mg/L	19-OCT-18	19-OCT-18	R4289319
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	19-OCT-18	19-OCT-18	R4289319
Lithium (Li)-Dissolved	0.0115		0.0010	mg/L	19-OCT-18	19-OCT-18	R4289319
Magnesium (Mg)-Dissolved	40.3		0.10	mg/L	19-OCT-18	19-OCT-18	R4289319
Manganese (Mn)-Dissolved	0.186		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Molybdenum (Mo)-Dissolved	0.00243		0.000050	mg/L	19-OCT-18	19-OCT-18	R4289319
Nickel (Ni)-Dissolved	0.00185		0.00050	mg/L	19-OCT-18	19-OCT-18	R4289319
Potassium (K)-Dissolved	1.61		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Selenium (Se)-Dissolved	3.39		0.050	ug/L	19-OCT-18	19-OCT-18	R4289319
Silicon (Si)-Dissolved	4.67		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	19-OCT-18	19-OCT-18	R4289319
Sodium (Na)-Dissolved	6.74		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Strontium (Sr)-Dissolved	0.338		0.00020	mg/L	19-OCT-18	19-OCT-18	R4289319
Thallium (Tl)-Dissolved	0.000019		0.000010	mg/L	19-OCT-18	19-OCT-18	R4289319
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	19-OCT-18	19-OCT-18	R4289319
Uranium (U)-Dissolved	0.00245		0.000010	mg/L	19-OCT-18	19-OCT-18	R4289319
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	19-OCT-18	19-OCT-18	R4289319
Zinc (Zn)-Dissolved	0.0065		0.0010	mg/L	19-OCT-18	19-OCT-18	R4289319
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	407		0.50	mg/L		23-OCT-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		20-OCT-18	R4295236
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		23-OCT-18	R4293929
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		20-OCT-18	R4295236
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-1 GH_POTW09_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:45							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Arsenic (As)-Total	0.00049		0.00010	mg/L		20-OCT-18	R4295236
Barium (Ba)-Total	0.0340		0.00010	mg/L		20-OCT-18	R4295236
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		20-OCT-18	R4295236
Boron (B)-Total	0.020		0.010	mg/L		20-OCT-18	R4295236
Cadmium (Cd)-Total	0.0091		0.0050	ug/L		20-OCT-18	R4295236
Calcium (Ca)-Total	98.2		0.050	mg/L		20-OCT-18	R4295236
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236
Cobalt (Co)-Total	0.19		0.10	ug/L		20-OCT-18	R4295236
Copper (Cu)-Total	0.00249		0.00050	mg/L		20-OCT-18	R4295236
Iron (Fe)-Total	0.170		0.010	mg/L		20-OCT-18	R4295236
Lead (Pb)-Total	<0.000050		0.000050	mg/L		20-OCT-18	R4295236
Lithium (Li)-Total	0.0119		0.0010	mg/L		20-OCT-18	R4295236
Magnesium (Mg)-Total	41.8		0.10	mg/L		20-OCT-18	R4295236
Manganese (Mn)-Total	0.195		0.00010	mg/L		20-OCT-18	R4295236
Molybdenum (Mo)-Total	0.00269		0.000050	mg/L		20-OCT-18	R4295236
Nickel (Ni)-Total	0.00197		0.00050	mg/L		20-OCT-18	R4295236
Potassium (K)-Total	1.59		0.050	mg/L		20-OCT-18	R4295236
Selenium (Se)-Total	3.08		0.050	ug/L		20-OCT-18	R4295236
Silicon (Si)-Total	5.08		0.10	mg/L		20-OCT-18	R4295236
Silver (Ag)-Total	<0.000010		0.000010	mg/L		20-OCT-18	R4295236
Sodium (Na)-Total	6.81		0.050	mg/L		20-OCT-18	R4295236
Strontium (Sr)-Total	0.343		0.00020	mg/L		20-OCT-18	R4295236
Thallium (Tl)-Total	0.000018		0.000010	mg/L		20-OCT-18	R4295236
Tin (Sn)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236
Titanium (Ti)-Total	<0.010		0.010	mg/L		20-OCT-18	R4295236
Uranium (U)-Total	0.00240		0.000010	mg/L		20-OCT-18	R4295236
Vanadium (V)-Total	<0.00050		0.00050	mg/L		20-OCT-18	R4295236
Zinc (Zn)-Total	0.0053		0.0030	mg/L		20-OCT-18	R4295236
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	2.0		1.0	mg/L		22-OCT-18	R4294875
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	257		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Total (as CaCO3)	257		1.0	mg/L		20-OCT-18	R4292487
Ammonia, Total (as N)							
Ammonia as N	0.0389		0.0050	mg/L		23-OCT-18	R4295198
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		18-OCT-18	R4288142
Chloride in Water by IC							
Chloride (Cl)	6.66		0.50	mg/L		18-OCT-18	R4288142
Electrical Conductivity (EC)							
Conductivity (@ 25C)	747		2.0	uS/cm		20-OCT-18	R4292487
Fluoride in Water by IC							
Fluoride (F)	0.798		0.020	mg/L		18-OCT-18	R4288142
Ion Balance Calculation							
Ion Balance	96.3		-100	%		23-OCT-18	
Ion Balance Calculation							
Cation - Anion Balance	-1.9			%		23-OCT-18	
Anion Sum	8.81			meq/L		23-OCT-18	
Cation Sum	8.48			meq/L		23-OCT-18	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-1 GH_POTW09_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:45							
Matrix: WG							
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.0263		0.0050	mg/L		18-OCT-18	R4288142
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0010		0.0010	mg/L		18-OCT-18	R4288142
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		18-OCT-18	R4285867
Oxidation redution potential by elect.							
ORP	301		-1000	mV		21-OCT-18	R4290387
Phosphorus (P)-Total							
Phosphorus (P)-Total	<0.0020		0.0020	mg/L		19-OCT-18	R4288870
Sulfate in Water by IC							
Sulfate (SO4)	166		0.30	mg/L		18-OCT-18	R4288142
Total Dissolved Solids							
Total Dissolved Solids	504	DLHC	20	mg/L		21-OCT-18	R4295238
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		23-OCT-18	R4296280
Turbidity							
Turbidity	0.94		0.10	NTU		18-OCT-18	R4289142
pH							
pH	8.03		0.10	pH		20-OCT-18	R4292487
L2182357-2 GH_GHER2_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:00							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	1.67	RRV	0.50	mg/L		23-OCT-18	R4297167
Total Kjeldahl Nitrogen	0.127		0.050	mg/L		19-OCT-18	R4289276
Total Organic Carbon	1.10	RRV	0.50	mg/L		23-OCT-18	R4297167
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	19-OCT-18	21-OCT-18	R4290008
Dissolved Mercury Filtration Location	FIELD					19-OCT-18	R4287554
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	756		0.63	mg/L		24-OCT-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		24-OCT-18	R4295618
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		23-OCT-18	R4293929
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0052		0.0030	mg/L		24-OCT-18	R4295618
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		24-OCT-18	R4295618
Arsenic (As)-Total	0.00014		0.00010	mg/L		24-OCT-18	R4295618
Barium (Ba)-Total	0.0288		0.00010	mg/L		24-OCT-18	R4295618
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		24-OCT-18	R4295618
Boron (B)-Total	0.020		0.010	mg/L		24-OCT-18	R4295618
Cadmium (Cd)-Total	0.0382		0.0050	ug/L		24-OCT-18	R4295618
Calcium (Ca)-Total	159		0.050	mg/L		24-OCT-18	R4295618
Chromium (Cr)-Total	0.00012		0.00010	mg/L		24-OCT-18	R4295618
Cobalt (Co)-Total	<0.10		0.10	ug/L		24-OCT-18	R4295618
Copper (Cu)-Total	<0.00050		0.00050	mg/L		24-OCT-18	R4295618
Iron (Fe)-Total	0.134		0.010	mg/L		24-OCT-18	R4295618
Lead (Pb)-Total	0.000850		0.000050	mg/L		24-OCT-18	R4295618
Lithium (Li)-Total	0.0118		0.0010	mg/L		24-OCT-18	R4295618

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-2 GH_GHER2_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:00							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Magnesium (Mg)-Total	70.5		0.10	mg/L		24-OCT-18	R4295618
Manganese (Mn)-Total	0.0446		0.00010	mg/L		24-OCT-18	R4295618
Molybdenum (Mo)-Total	0.00102		0.000050	mg/L		24-OCT-18	R4295618
Nickel (Ni)-Total	0.0208		0.00050	mg/L		24-OCT-18	R4295618
Potassium (K)-Total	1.71		0.050	mg/L		24-OCT-18	R4295618
Selenium (Se)-Total	7.45		0.050	ug/L		24-OCT-18	R4295618
Silicon (Si)-Total	4.45		0.10	mg/L		24-OCT-18	R4295618
Silver (Ag)-Total	<0.000010		0.000010	mg/L		24-OCT-18	R4295618
Sodium (Na)-Total	7.98		0.050	mg/L		24-OCT-18	R4295618
Strontium (Sr)-Total	0.442		0.00020	mg/L		24-OCT-18	R4295618
Thallium (Tl)-Total	0.000014		0.000010	mg/L		24-OCT-18	R4295618
Tin (Sn)-Total	<0.00010		0.00010	mg/L		24-OCT-18	R4295618
Titanium (Ti)-Total	<0.010		0.010	mg/L		24-OCT-18	R4295618
Uranium (U)-Total	0.00245		0.000010	mg/L		24-OCT-18	R4295618
Vanadium (V)-Total	<0.00050		0.00050	mg/L		24-OCT-18	R4295618
Zinc (Zn)-Total	0.0035		0.0030	mg/L		24-OCT-18	R4295618
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<1.0		1.0	mg/L		22-OCT-18	R4294875
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	258		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Total (as CaCO3)	258		1.0	mg/L		20-OCT-18	R4292487
Ammonia, Total (as N)							
Ammonia as N	0.0211		0.0050	mg/L		23-OCT-18	R4295198
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLHC	0.25	mg/L		18-OCT-18	R4288142
Chloride in Water by IC							
Chloride (Cl)	19.1	DLHC	2.5	mg/L		18-OCT-18	R4288142
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	LAB					23-OCT-18	R4295647
Calcium (Ca)-Dissolved	177	DLDS	0.25	mg/L		23-OCT-18	R4295018
Magnesium (Mg)-Dissolved	76.3	DLDS	0.025	mg/L		23-OCT-18	R4295018
Potassium (K)-Dissolved	1.59	DLDS	0.25	mg/L		23-OCT-18	R4295018
Sodium (Na)-Dissolved	8.91	DLDS	0.25	mg/L		23-OCT-18	R4295018
Electrical Conductivity (EC)							
Conductivity (@ 25C)	1230		2.0	uS/cm		20-OCT-18	R4292487
Fluoride in Water by IC							
Fluoride (F)	0.16	DLHC	0.10	mg/L		18-OCT-18	R4288142
Ion Balance Calculation							
Cation - Anion Balance	0.0			%		24-OCT-18	
Anion Sum	15.5			meq/L		24-OCT-18	
Cation Sum	15.5			meq/L		24-OCT-18	
Ion Balance Calculation							
Ion Balance	100		-100	%		24-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.752	DLHC	0.025	mg/L		18-OCT-18	R4288142
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0050	DLHC	0.0050	mg/L		18-OCT-18	R4288142
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		18-OCT-18	R4285867

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-2 GH_GHER2_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:00							
Matrix: WG							
Oxidation redution potential by elect.							
ORP	291		-1000	mV		21-OCT-18	R4290387
Phosphorus (P)-Total							
Phosphorus (P)-Total	<0.0020		0.0020	mg/L		19-OCT-18	R4288870
Sulfate in Water by IC							
Sulfate (SO4)	469	DLHC	1.5	mg/L		18-OCT-18	R4288142
Total Dissolved Solids							
Total Dissolved Solids	976	DLHC	20	mg/L		23-OCT-18	R4296702
Total Suspended Solids							
Total Suspended Solids	1.1		1.0	mg/L		23-OCT-18	R4296280
Turbidity							
Turbidity	0.80		0.10	NTU		18-OCT-18	R4289142
pH							
pH	8.18		0.10	pH		20-OCT-18	R4292487
L2182357-3 GH_GHLRP2_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:00							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	<0.50		0.50	mg/L		23-OCT-18	R4297167
Total Kjeldahl Nitrogen	0.093		0.050	mg/L		19-OCT-18	R4289276
Total Organic Carbon	<0.50		0.50	mg/L		23-OCT-18	R4297167
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	19-OCT-18	21-OCT-18	R4290008
Dissolved Mercury Filtration Location	FIELD					19-OCT-18	R4287554
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	<0.50		0.50	mg/L		24-OCT-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		20-OCT-18	R4295236
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		23-OCT-18	R4293929
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		20-OCT-18	R4295236
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236
Arsenic (As)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236
Barium (Ba)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		20-OCT-18	R4295236
Boron (B)-Total	<0.010		0.010	mg/L		20-OCT-18	R4295236
Cadmium (Cd)-Total	<0.0050		0.0050	ug/L		20-OCT-18	R4295236
Calcium (Ca)-Total	<0.050		0.050	mg/L		20-OCT-18	R4295236
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236
Cobalt (Co)-Total	<0.10		0.10	ug/L		20-OCT-18	R4295236
Copper (Cu)-Total	<0.00050		0.00050	mg/L		20-OCT-18	R4295236
Iron (Fe)-Total	<0.010		0.010	mg/L		20-OCT-18	R4295236
Lead (Pb)-Total	<0.000050		0.000050	mg/L		20-OCT-18	R4295236
Lithium (Li)-Total	<0.0010		0.0010	mg/L		20-OCT-18	R4295236
Magnesium (Mg)-Total	<0.10		0.10	mg/L		20-OCT-18	R4295236
Manganese (Mn)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L		20-OCT-18	R4295236
Nickel (Ni)-Total	<0.00050		0.00050	mg/L		20-OCT-18	R4295236
Potassium (K)-Total	<0.050		0.050	mg/L		20-OCT-18	R4295236
Selenium (Se)-Total	<0.050		0.050	ug/L		20-OCT-18	R4295236

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-3 GH_GHLRP2_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:00							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Silicon (Si)-Total	<0.10		0.10	mg/L		20-OCT-18	R4295236
Silver (Ag)-Total	<0.000010		0.000010	mg/L		20-OCT-18	R4295236
Sodium (Na)-Total	<0.050		0.050	mg/L		20-OCT-18	R4295236
Strontium (Sr)-Total	<0.00020		0.00020	mg/L		20-OCT-18	R4295236
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		20-OCT-18	R4295236
Tin (Sn)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236
Titanium (Ti)-Total	<0.010		0.010	mg/L		20-OCT-18	R4295236
Uranium (U)-Total	<0.000010		0.000010	mg/L		20-OCT-18	R4295236
Vanadium (V)-Total	<0.00050		0.00050	mg/L		20-OCT-18	R4295236
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		20-OCT-18	R4295236
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	1.9		1.0	mg/L		22-OCT-18	R4294875
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	<1.0		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Total (as CaCO3)	<1.0		1.0	mg/L		20-OCT-18	R4292487
Ammonia, Total (as N)							
Ammonia as N	0.0163		0.0050	mg/L		23-OCT-18	R4295198
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		18-OCT-18	R4288142
Chloride in Water by IC							
Chloride (Cl)	<0.50		0.50	mg/L		18-OCT-18	R4288142
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	LAB					23-OCT-18	R4295647
Calcium (Ca)-Dissolved	<0.050		0.050	mg/L		23-OCT-18	R4295018
Magnesium (Mg)-Dissolved	<0.0050		0.0050	mg/L		23-OCT-18	R4295018
Potassium (K)-Dissolved	<0.050		0.050	mg/L		23-OCT-18	R4295018
Sodium (Na)-Dissolved	<0.050		0.050	mg/L		23-OCT-18	R4295018
Electrical Conductivity (EC)							
Conductivity (@ 25C)	<2.0		2.0	uS/cm		20-OCT-18	R4292487
Fluoride in Water by IC							
Fluoride (F)	<0.020		0.020	mg/L		18-OCT-18	R4288142
Ion Balance Calculation							
Cation - Anion Balance	0.0			%		24-OCT-18	
Anion Sum	<0.10			meq/L		24-OCT-18	
Cation Sum	<0.10			meq/L		24-OCT-18	
Ion Balance Calculation							
Ion Balance	0.0		-100	%		24-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	<0.0050		0.0050	mg/L		18-OCT-18	R4288142
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0010		0.0010	mg/L		18-OCT-18	R4288142
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	0.0013		0.0010	mg/L		18-OCT-18	R4285867
Oxidation redution potential by elect.							
ORP	393		-1000	mV		23-OCT-18	R4295222
Phosphorus (P)-Total							
Phosphorus (P)-Total	<0.0020		0.0020	mg/L		19-OCT-18	R4288870
Sulfate in Water by IC							
Sulfate (SO4)	<0.30		0.30	mg/L		18-OCT-18	R4288142

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-3 GH_GHLRP2_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:00							
Matrix: WG							
Total Dissolved Solids							
Total Dissolved Solids	<10		10	mg/L		23-OCT-18	R4296702
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		23-OCT-18	R4296280
Turbidity							
Turbidity	0.13		0.10	NTU		18-OCT-18	R4289142
pH							
pH	5.73		0.10	pH		20-OCT-18	R4292487
L2182357-4 GH_POTW17_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 13:15							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	1.41		0.50	mg/L		23-OCT-18	R4297167
Total Kjeldahl Nitrogen	0.142		0.050	mg/L		19-OCT-18	R4289276
Total Organic Carbon	1.23		0.50	mg/L		23-OCT-18	R4297167
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	19-OCT-18	19-OCT-18	R4289319
Dissolved Metals Filtration Location	FIELD					19-OCT-18	R4287623
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	19-OCT-18	21-OCT-18	R4290008
Dissolved Mercury Filtration Location	FIELD					19-OCT-18	R4287554
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					19-OCT-18	R4287623
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	19-OCT-18	19-OCT-18	R4289319
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Arsenic (As)-Dissolved	0.00011		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Barium (Ba)-Dissolved	0.0328		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	19-OCT-18	19-OCT-18	R4289319
Boron (B)-Dissolved	0.022		0.010	mg/L	19-OCT-18	19-OCT-18	R4289319
Cadmium (Cd)-Dissolved	0.0440		0.0050	ug/L	19-OCT-18	19-OCT-18	R4289319
Calcium (Ca)-Dissolved	173		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Cobalt (Co)-Dissolved	0.11		0.10	ug/L	19-OCT-18	19-OCT-18	R4289319
Copper (Cu)-Dissolved	<0.00050		0.00050	mg/L	19-OCT-18	19-OCT-18	R4289319
Iron (Fe)-Dissolved	0.141		0.010	mg/L	19-OCT-18	19-OCT-18	R4289319
Lead (Pb)-Dissolved	0.00185		0.000050	mg/L	19-OCT-18	19-OCT-18	R4289319
Lithium (Li)-Dissolved	0.0130		0.0010	mg/L	19-OCT-18	19-OCT-18	R4289319
Magnesium (Mg)-Dissolved	69.5		0.10	mg/L	19-OCT-18	19-OCT-18	R4289319
Manganese (Mn)-Dissolved	0.0432		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Molybdenum (Mo)-Dissolved	0.00106		0.000050	mg/L	19-OCT-18	19-OCT-18	R4289319
Nickel (Ni)-Dissolved	0.0500		0.00050	mg/L	19-OCT-18	19-OCT-18	R4289319
Potassium (K)-Dissolved	1.72		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Selenium (Se)-Dissolved	7.30		0.050	ug/L	19-OCT-18	19-OCT-18	R4289319
Silicon (Si)-Dissolved	4.48		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	19-OCT-18	19-OCT-18	R4289319
Sodium (Na)-Dissolved	8.23		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Strontium (Sr)-Dissolved	0.451		0.00020	mg/L	19-OCT-18	19-OCT-18	R4289319
Thallium (Tl)-Dissolved	0.000014		0.000010	mg/L	19-OCT-18	19-OCT-18	R4289319
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	19-OCT-18	19-OCT-18	R4289319
Uranium (U)-Dissolved	0.00253		0.000010	mg/L	19-OCT-18	19-OCT-18	R4289319

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-4 GH_POTW17_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 13:15							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	19-OCT-18	19-OCT-18	R4289319
Zinc (Zn)-Dissolved	0.0073		0.0010	mg/L	19-OCT-18	19-OCT-18	R4289319
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	717		0.50	mg/L		23-OCT-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		20-OCT-18	R4295236
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		23-OCT-18	R4293929
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0053		0.0030	mg/L		20-OCT-18	R4295236
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236
Arsenic (As)-Total	0.00015		0.00010	mg/L		20-OCT-18	R4295236
Barium (Ba)-Total	0.0302		0.00010	mg/L		20-OCT-18	R4295236
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		20-OCT-18	R4295236
Boron (B)-Total	0.024		0.010	mg/L		20-OCT-18	R4295236
Cadmium (Cd)-Total	0.0384		0.0050	ug/L		20-OCT-18	R4295236
Calcium (Ca)-Total	174		0.050	mg/L		20-OCT-18	R4295236
Chromium (Cr)-Total	0.00010		0.00010	mg/L		20-OCT-18	R4295236
Cobalt (Co)-Total	<0.10		0.10	ug/L		20-OCT-18	R4295236
Copper (Cu)-Total	<0.00050		0.00050	mg/L		20-OCT-18	R4295236
Iron (Fe)-Total	0.132		0.010	mg/L		20-OCT-18	R4295236
Lead (Pb)-Total	0.00292		0.000050	mg/L		20-OCT-18	R4295236
Lithium (Li)-Total	0.0139		0.0010	mg/L		20-OCT-18	R4295236
Magnesium (Mg)-Total	72.4		0.10	mg/L		20-OCT-18	R4295236
Manganese (Mn)-Total	0.0289		0.00010	mg/L		20-OCT-18	R4295236
Molybdenum (Mo)-Total	0.00112		0.000050	mg/L		20-OCT-18	R4295236
Nickel (Ni)-Total	0.0701		0.00050	mg/L		20-OCT-18	R4295236
Potassium (K)-Total	1.69		0.050	mg/L		20-OCT-18	R4295236
Selenium (Se)-Total	7.08		0.050	ug/L		20-OCT-18	R4295236
Silicon (Si)-Total	4.64		0.10	mg/L		20-OCT-18	R4295236
Silver (Ag)-Total	<0.000010		0.000010	mg/L		20-OCT-18	R4295236
Sodium (Na)-Total	8.12		0.050	mg/L		20-OCT-18	R4295236
Strontium (Sr)-Total	0.474		0.00020	mg/L		20-OCT-18	R4295236
Thallium (Tl)-Total	0.000016		0.000010	mg/L		20-OCT-18	R4295236
Tin (Sn)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236
Titanium (Ti)-Total	<0.010		0.010	mg/L		20-OCT-18	R4295236
Uranium (U)-Total	0.00238		0.000010	mg/L		20-OCT-18	R4295236
Vanadium (V)-Total	<0.00050		0.00050	mg/L		20-OCT-18	R4295236
Zinc (Zn)-Total	0.0046		0.0030	mg/L		20-OCT-18	R4295236
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<1.0		1.0	mg/L		22-OCT-18	R4294875
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	264		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Total (as CaCO3)	264		1.0	mg/L		20-OCT-18	R4292487
Ammonia, Total (as N)							
Ammonia as N	0.0147		0.0050	mg/L		23-OCT-18	R4295198
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLHC	0.25	mg/L		18-OCT-18	R4288142

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-4 GH_POTW17_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 13:15							
Matrix: WG							
Chloride in Water by IC							
Chloride (Cl)	19.5	DLHC	2.5	mg/L		18-OCT-18	R4288142
Electrical Conductivity (EC)							
Conductivity (@ 25C)	1240		2.0	uS/cm		20-OCT-18	R4292487
Fluoride in Water by IC							
Fluoride (F)	0.17	DLHC	0.10	mg/L		18-OCT-18	R4288142
Ion Balance Calculation							
Cation - Anion Balance	-3.3			%		23-OCT-18	
Anion Sum	15.7			meq/L		23-OCT-18	
Cation Sum	14.7			meq/L		23-OCT-18	
Ion Balance Calculation							
Ion Balance	93.6		-100	%		23-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.432	DLHC	0.025	mg/L		18-OCT-18	R4288142
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	<0.0050	DLHC	0.0050	mg/L		18-OCT-18	R4288142
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	<0.0010		0.0010	mg/L		18-OCT-18	R4285867
Oxidation redution potential by elect.							
ORP	428		-1000	mV		23-OCT-18	R4295222
Phosphorus (P)-Total							
Phosphorus (P)-Total	<0.0020		0.0020	mg/L		19-OCT-18	R4288870
Sulfate in Water by IC							
Sulfate (SO4)	475	DLHC	1.5	mg/L		18-OCT-18	R4288142
Total Dissolved Solids							
Total Dissolved Solids	997	DLHC	20	mg/L		23-OCT-18	R4296702
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		23-OCT-18	R4296280
Turbidity							
Turbidity	0.53		0.10	NTU		18-OCT-18	R4289142
pH							
pH	8.20		0.10	pH		20-OCT-18	R4292487
L2182357-5 GH_POTW06_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:56							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	1.31		0.50	mg/L		23-OCT-18	R4297167
Total Kjeldahl Nitrogen	0.230		0.050	mg/L		19-OCT-18	R4289276
Total Organic Carbon	1.11		0.50	mg/L		23-OCT-18	R4297167
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	19-OCT-18	19-OCT-18	R4289319
Dissolved Metals Filtration Location	FIELD					19-OCT-18	R4287623
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	19-OCT-18	21-OCT-18	R4290008
Dissolved Mercury Filtration Location	FIELD					19-OCT-18	R4287554
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					24-OCT-18	R4295453
Dissolved Metals Filtration Location	FIELD					19-OCT-18	R4287623
Aluminum (Al)-Dissolved	0.0038		0.0030	mg/L	19-OCT-18	19-OCT-18	R4289319
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-5 GH_POTW06_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:56							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Barium (Ba)-Dissolved	0.0635		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	19-OCT-18	19-OCT-18	R4289319
Boron (B)-Dissolved	0.013		0.010	mg/L	19-OCT-18	19-OCT-18	R4289319
Cadmium (Cd)-Dissolved	0.0613		0.0050	ug/L	19-OCT-18	19-OCT-18	R4289319
Calcium (Ca)-Dissolved	170		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	19-OCT-18	19-OCT-18	R4289319
Copper (Cu)-Dissolved	0.00242		0.00050	mg/L	19-OCT-18	19-OCT-18	R4289319
Iron (Fe)-Dissolved	0.014		0.010	mg/L	19-OCT-18	19-OCT-18	R4289319
Lead (Pb)-Dissolved	0.000592		0.000050	mg/L	19-OCT-18	19-OCT-18	R4289319
Lithium (Li)-Dissolved	0.0102		0.0010	mg/L	19-OCT-18	19-OCT-18	R4289319
Magnesium (Mg)-Dissolved	85.9		0.10	mg/L	19-OCT-18	19-OCT-18	R4289319
Manganese (Mn)-Dissolved	0.00216		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Molybdenum (Mo)-Dissolved	0.000906		0.000050	mg/L	19-OCT-18	19-OCT-18	R4289319
Nickel (Ni)-Dissolved	0.00135		0.00050	mg/L	19-OCT-18	19-OCT-18	R4289319
Potassium (K)-Dissolved	1.72		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Selenium (Se)-Dissolved	30.6		0.050	ug/L	19-OCT-18	19-OCT-18	R4289319
Silicon (Si)-Dissolved	3.98		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	19-OCT-18	19-OCT-18	R4289319
Sodium (Na)-Dissolved	6.97		0.050	mg/L	19-OCT-18	19-OCT-18	R4289319
Strontium (Sr)-Dissolved	0.321		0.00020	mg/L	19-OCT-18	19-OCT-18	R4289319
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	19-OCT-18	19-OCT-18	R4289319
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	19-OCT-18	19-OCT-18	R4289319
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	19-OCT-18	19-OCT-18	R4289319
Uranium (U)-Dissolved	0.00393		0.000010	mg/L	19-OCT-18	19-OCT-18	R4289319
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	19-OCT-18	19-OCT-18	R4289319
Zinc (Zn)-Dissolved	0.0165	DTC	0.0010	mg/L	24-OCT-18	24-OCT-18	R4295762
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	779		0.50	mg/L		24-OCT-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		20-OCT-18	R4295236
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		23-OCT-18	R4293929
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		20-OCT-18	R4295236
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		20-OCT-18	R4295236
Arsenic (As)-Total	0.00011		0.00010	mg/L		20-OCT-18	R4295236
Barium (Ba)-Total	0.0555		0.00010	mg/L		20-OCT-18	R4295236
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		20-OCT-18	R4295236
Boron (B)-Total	0.015		0.010	mg/L		20-OCT-18	R4295236
Cadmium (Cd)-Total	0.0468		0.0050	ug/L		20-OCT-18	R4295236
Calcium (Ca)-Total	178		0.050	mg/L		20-OCT-18	R4295236
Chromium (Cr)-Total	0.00014		0.00010	mg/L		20-OCT-18	R4295236
Cobalt (Co)-Total	<0.10		0.10	ug/L		20-OCT-18	R4295236
Copper (Cu)-Total	0.00502		0.00050	mg/L		20-OCT-18	R4295236
Iron (Fe)-Total	0.131		0.010	mg/L		20-OCT-18	R4295236
Lead (Pb)-Total	0.000671		0.000050	mg/L		20-OCT-18	R4295236
Lithium (Li)-Total	0.0113		0.0010	mg/L		20-OCT-18	R4295236
Magnesium (Mg)-Total	90.9		0.10	mg/L		20-OCT-18	R4295236
Manganese (Mn)-Total	0.00263		0.00010	mg/L		20-OCT-18	R4295236
Molybdenum (Mo)-Total	0.000928		0.000050	mg/L		20-OCT-18	R4295236

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-5 GH_POTW06_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:56							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Nickel (Ni)-Total	0.00110		0.00050	mg/L		20-OCT-18	R4295236
Potassium (K)-Total	1.55		0.050	mg/L		20-OCT-18	R4295236
Selenium (Se)-Total	30.9		0.050	ug/L		20-OCT-18	R4295236
Silicon (Si)-Total	4.23		0.10	mg/L		20-OCT-18	R4295236
Silver (Ag)-Total	<0.000010		0.000010	mg/L		20-OCT-18	R4295236
Sodium (Na)-Total	6.67		0.050	mg/L		20-OCT-18	R4295236
Strontium (Sr)-Total	0.328		0.00020	mg/L		20-OCT-18	R4295236
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		20-OCT-18	R4295236
Tin (Sn)-Total	0.00014		0.00010	mg/L		20-OCT-18	R4295236
Titanium (Ti)-Total	<0.010		0.010	mg/L		20-OCT-18	R4295236
Uranium (U)-Total	0.00385		0.000010	mg/L		20-OCT-18	R4295236
Vanadium (V)-Total	<0.00050		0.00050	mg/L		20-OCT-18	R4295236
Zinc (Zn)-Total	0.0039		0.0030	mg/L		20-OCT-18	R4295236
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<1.0		1.0	mg/L		22-OCT-18	R4294875
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	269		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Carbonate (as CaCO3)	8.0		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		20-OCT-18	R4292487
Alkalinity, Total (as CaCO3)	277		1.0	mg/L		20-OCT-18	R4292487
Ammonia, Total (as N)							
Ammonia as N	0.0109		0.0050	mg/L		23-OCT-18	R4295198
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.25	DLHC	0.25	mg/L		18-OCT-18	R4288142
Chloride in Water by IC							
Chloride (Cl)	21.0	DLHC	2.5	mg/L		18-OCT-18	R4288142
Electrical Conductivity (EC)							
Conductivity (@ 25C)	1360		2.0	uS/cm		20-OCT-18	R4292487
Fluoride in Water by IC							
Fluoride (F)	0.15	DLHC	0.10	mg/L		18-OCT-18	R4288142
Ion Balance Calculation							
Ion Balance	92.0		-100	%		24-OCT-18	
Ion Balance Calculation							
Cation - Anion Balance	-4.2			%		24-OCT-18	
Anion Sum	17.3			meq/L		24-OCT-18	
Cation Sum	15.9			meq/L		24-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	1.69	DLHC	0.025	mg/L		18-OCT-18	R4288142
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.0052	DLHC	0.0050	mg/L		18-OCT-18	R4288142
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	0.0018		0.0010	mg/L		18-OCT-18	R4285867
Oxidation redution potential by elect.							
ORP	393		-1000	mV		23-OCT-18	R4295222
Phosphorus (P)-Total							
Phosphorus (P)-Total	<0.0020		0.0020	mg/L		19-OCT-18	R4288870
Sulfate in Water by IC							
Sulfate (SO4)	530	DLHC	1.5	mg/L		18-OCT-18	R4288142
Total Dissolved Solids							
Total Dissolved Solids	1050	DLHC	20	mg/L		23-OCT-18	R4296702
Total Suspended Solids							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2182357-5 GH_POTW06_WG_2018-10-01_NP							
Sampled By: JF on 16-OCT-18 @ 12:56							
Matrix: WG							
Total Suspended Solids							
Total Suspended Solids	1.3		1.0	mg/L		23-OCT-18	R4296280
Turbidity							
Turbidity	0.58		0.10	NTU		18-OCT-18	R4289142
pH							
pH	8.35		0.10	pH		20-OCT-18	R4292487

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-CL	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

QTR_WG_2018-10-01

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TECK COAL LIMITED (GREENHILLS)
BOX 5000
ELKFORD BC V0B1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4294875								
WG2911230-5 LCS								
Acidity (as CaCO3)			108.2		%		85-115	22-OCT-18
WG2911230-4 MB								
Acidity (as CaCO3)			2.0		mg/L		2	22-OCT-18
ALK-MAN-CL	**Water**							
Batch R4292487								
WG2910195-11 LCS								
Alkalinity, Total (as CaCO3)			100.6		%		85-115	20-OCT-18
WG2910195-14 LCS								
Alkalinity, Total (as CaCO3)			95.8		%		85-115	20-OCT-18
WG2910195-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	20-OCT-18
WG2910195-13 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	20-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4289319								
WG2908100-3 DUP		**L2182357-4**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	19-OCT-18
WG2908100-2 LCS								
Beryllium (Be)-Dissolved			92.0		%		80-120	19-OCT-18
WG2908100-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	19-OCT-18
BE-T-L-CCMS-VA	**Water**							
Batch R4295236								
WG2908126-2 LCS								
Beryllium (Be)-Total			106.3		%		80-120	20-OCT-18
WG2908126-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	20-OCT-18
BR-L-IC-N-CL	**Water**							
Batch R4288142								
WG2908495-2 LCS								
Bromide (Br)			100.8		%		85-115	18-OCT-18
WG2908495-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	18-OCT-18
C-DIS-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R4297167								
WG2912867-7 DUP		**L2182357-4**						
Dissolved Organic Carbon		1.41	1.25		mg/L	12	20	23-OCT-18
WG2912867-6 LCS								
Dissolved Organic Carbon			99.2		%		80-120	23-OCT-18
WG2912867-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	23-OCT-18
WG2912867-8 MS		**L2182357-5**						
Dissolved Organic Carbon			99.8		%		70-130	23-OCT-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4297167								
WG2912867-7 DUP		**L2182357-4**						
Total Organic Carbon		1.23	1.15		mg/L	6.4	20	23-OCT-18
WG2912867-6 LCS								
Total Organic Carbon			106.4		%		80-120	23-OCT-18
WG2912867-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-OCT-18
WG2912867-8 MS		**L2182357-5**						
Total Organic Carbon			101.8		%		70-130	23-OCT-18
CL-IC-N-CL	**Water**							
Batch R4288142								
WG2908495-2 LCS								
Chloride (Cl)			99.6		%		90-110	18-OCT-18
WG2908495-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-OCT-18
EC-L-PCT-CL	**Water**							
Batch R4292487								
WG2910195-11 LCS								
Conductivity (@ 25C)			99.9		%		90-110	20-OCT-18
WG2910195-14 LCS								
Conductivity (@ 25C)			100.6		%		90-110	20-OCT-18
WG2910195-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	20-OCT-18
WG2910195-13 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	20-OCT-18
F-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-CL	**Water**							
Batch R4288142								
WG2908495-2 LCS								
Fluoride (F)			101.5		%		90-110	18-OCT-18
WG2908495-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-OCT-18
HG-D-CVAA-VA	**Water**							
Batch R4290008								
WG2908022-6 LCS								
Mercury (Hg)-Dissolved			85.3		%		80-120	21-OCT-18
WG2908022-5 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	21-OCT-18
HG-T-CVAA-VA	**Water**							
Batch R4293929								
WG2911084-12 DUP		**L2182357-3**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	23-OCT-18
WG2911084-2 LCS								
Mercury (Hg)-Total			96.9		%		80-120	23-OCT-18
WG2911084-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	23-OCT-18
MET-D-CCMS-CL	**Water**							
Batch R4295018								
WG2911717-10 LCS		**TMRM**						
Calcium (Ca)-Dissolved			90.8		%		80-120	23-OCT-18
Magnesium (Mg)-Dissolved			93.9		%		80-120	23-OCT-18
Potassium (K)-Dissolved			93.8		%		80-120	23-OCT-18
Sodium (Na)-Dissolved			98.9		%		80-120	23-OCT-18
WG2911717-14 LCS		**TMRM**						
Calcium (Ca)-Dissolved			97.4		%		80-120	23-OCT-18
Magnesium (Mg)-Dissolved			97.3		%		80-120	23-OCT-18
Potassium (K)-Dissolved			94.3		%		80-120	23-OCT-18
Sodium (Na)-Dissolved			95.6		%		80-120	23-OCT-18
WG2911717-2 LCS		**TMRM**						
Calcium (Ca)-Dissolved			96.1		%		80-120	23-OCT-18
Magnesium (Mg)-Dissolved			93.9		%		80-120	23-OCT-18
Potassium (K)-Dissolved			88.4		%		80-120	23-OCT-18
Sodium (Na)-Dissolved			99.97		%		80-120	23-OCT-18
WG2911717-6 LCS		**TMRM**						
Calcium (Ca)-Dissolved			93.9		%		80-120	23-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R4295018								
WG2911717-6 LCS		**TMRM**						
Magnesium (Mg)-Dissolved			92.2		%		80-120	23-OCT-18
Potassium (K)-Dissolved			89.7		%		80-120	23-OCT-18
Sodium (Na)-Dissolved			97.9		%		80-120	23-OCT-18
WG2911717-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
WG2911717-13 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
WG2911717-5 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
WG2911717-9 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
WG2911717-4 MS		**L2182357-3**						
Calcium (Ca)-Dissolved			99.6		%		70-130	23-OCT-18
Magnesium (Mg)-Dissolved			101.3		%		70-130	23-OCT-18
Potassium (K)-Dissolved			95.1		%		70-130	23-OCT-18
Sodium (Na)-Dissolved			105.4		%		70-130	23-OCT-18
MET-D-CCMS-VA	**Water**							
Batch R4289319								
WG2908100-3 DUP		**L2182357-4**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	19-OCT-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	19-OCT-18
Arsenic (As)-Dissolved		0.00011	<0.00010	RPD-NA	mg/L	N/A	20	19-OCT-18
Barium (Ba)-Dissolved		0.0328	0.0319		mg/L	2.8	20	19-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4289319								
WG2908100-3 DUP		**L2182357-4**						
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	19-OCT-18
Boron (B)-Dissolved		0.022	0.022		mg/L	0.1	20	19-OCT-18
Cadmium (Cd)-Dissolved		0.0000440	0.0000378		mg/L	15	20	19-OCT-18
Calcium (Ca)-Dissolved		173	173		mg/L	0.5	20	19-OCT-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	19-OCT-18
Cobalt (Co)-Dissolved		0.00011	<0.00010	RPD-NA	mg/L	N/A	20	19-OCT-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-OCT-18
Iron (Fe)-Dissolved		0.141	0.140		mg/L	0.7	20	19-OCT-18
Lead (Pb)-Dissolved		0.00185	0.00177		mg/L	4.4	20	19-OCT-18
Lithium (Li)-Dissolved		0.0130	0.0130		mg/L	0.3	20	19-OCT-18
Magnesium (Mg)-Dissolved		69.5	68.4		mg/L	1.6	20	19-OCT-18
Manganese (Mn)-Dissolved		0.0432	0.0419		mg/L	3.1	20	19-OCT-18
Molybdenum (Mo)-Dissolved		0.00106	0.00104		mg/L	1.9	20	19-OCT-18
Nickel (Ni)-Dissolved		0.0500	0.0487		mg/L	2.6	20	19-OCT-18
Potassium (K)-Dissolved		1.72	1.68		mg/L	2.0	20	19-OCT-18
Selenium (Se)-Dissolved		0.00730	0.00749		mg/L	2.5	20	19-OCT-18
Silicon (Si)-Dissolved		4.48	4.52		mg/L	1.0	20	19-OCT-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	19-OCT-18
Sodium (Na)-Dissolved		8.23	8.13		mg/L	1.2	20	19-OCT-18
Strontium (Sr)-Dissolved		0.451	0.458		mg/L	1.5	20	19-OCT-18
Thallium (Tl)-Dissolved		0.000014	0.000015		mg/L	3.5	20	19-OCT-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	19-OCT-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	19-OCT-18
Uranium (U)-Dissolved		0.00253	0.00243		mg/L	3.9	20	19-OCT-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-OCT-18
Zinc (Zn)-Dissolved		0.0073	0.0071		mg/L	2.0	20	19-OCT-18
WG2908100-2 LCS								
Aluminum (Al)-Dissolved			104.5		%		80-120	19-OCT-18
Antimony (Sb)-Dissolved			101.1		%		80-120	19-OCT-18
Arsenic (As)-Dissolved			103.0		%		80-120	19-OCT-18
Barium (Ba)-Dissolved			109.7		%		80-120	19-OCT-18
Bismuth (Bi)-Dissolved			106.1		%		80-120	19-OCT-18
Boron (B)-Dissolved			89.7		%		80-120	19-OCT-18
Cadmium (Cd)-Dissolved			103.1		%		80-120	19-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4289319								
WG2908100-2 LCS								
Calcium (Ca)-Dissolved			93.1		%		80-120	19-OCT-18
Chromium (Cr)-Dissolved			97.7		%		80-120	19-OCT-18
Cobalt (Co)-Dissolved			100.5		%		80-120	19-OCT-18
Copper (Cu)-Dissolved			99.4		%		80-120	19-OCT-18
Iron (Fe)-Dissolved			95.6		%		80-120	19-OCT-18
Lead (Pb)-Dissolved			101.0		%		80-120	19-OCT-18
Lithium (Li)-Dissolved			90.2		%		80-120	19-OCT-18
Magnesium (Mg)-Dissolved			97.0		%		80-120	19-OCT-18
Manganese (Mn)-Dissolved			101.7		%		80-120	19-OCT-18
Molybdenum (Mo)-Dissolved			97.4		%		80-120	19-OCT-18
Nickel (Ni)-Dissolved			101.7		%		80-120	19-OCT-18
Potassium (K)-Dissolved			112.5		%		80-120	19-OCT-18
Selenium (Se)-Dissolved			100.5		%		80-120	19-OCT-18
Silicon (Si)-Dissolved			99.9		%		60-140	19-OCT-18
Silver (Ag)-Dissolved			94.8		%		80-120	19-OCT-18
Sodium (Na)-Dissolved			104.0		%		80-120	19-OCT-18
Strontium (Sr)-Dissolved			97.3		%		80-120	19-OCT-18
Thallium (Tl)-Dissolved			109.4		%		80-120	19-OCT-18
Tin (Sn)-Dissolved			96.2		%		80-120	19-OCT-18
Titanium (Ti)-Dissolved			99.4		%		80-120	19-OCT-18
Uranium (U)-Dissolved			102.1		%		80-120	19-OCT-18
Vanadium (V)-Dissolved			102.8		%		80-120	19-OCT-18
Zinc (Zn)-Dissolved			98.9		%		80-120	19-OCT-18
WG2908100-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	19-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	19-OCT-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	19-OCT-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	19-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	19-OCT-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4289319								
WG2908100-1 MB		**NP**						
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	19-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	19-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	19-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	19-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	19-OCT-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	19-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	19-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	19-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	19-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	19-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	19-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	19-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	19-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	19-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	19-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	19-OCT-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	19-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	19-OCT-18
Batch R4295762								
WG2912253-2 LCS								
Aluminum (Al)-Dissolved			101.5		%		80-120	24-OCT-18
Antimony (Sb)-Dissolved			106.1		%		80-120	24-OCT-18
Arsenic (As)-Dissolved			101.3		%		80-120	24-OCT-18
Barium (Ba)-Dissolved			98.8		%		80-120	24-OCT-18
Bismuth (Bi)-Dissolved			101.4		%		80-120	24-OCT-18
Boron (B)-Dissolved			97.1		%		80-120	24-OCT-18
Cadmium (Cd)-Dissolved			100.6		%		80-120	24-OCT-18
Calcium (Ca)-Dissolved			98.4		%		80-120	24-OCT-18
Chromium (Cr)-Dissolved			99.3		%		80-120	24-OCT-18
Cobalt (Co)-Dissolved			100.4		%		80-120	24-OCT-18
Copper (Cu)-Dissolved			98.6		%		80-120	24-OCT-18
Iron (Fe)-Dissolved			93.5		%		80-120	24-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4295762								
WG2912253-2 LCS								
Lead (Pb)-Dissolved			97.5		%		80-120	24-OCT-18
Lithium (Li)-Dissolved			96.4		%		80-120	24-OCT-18
Magnesium (Mg)-Dissolved			107.6		%		80-120	24-OCT-18
Manganese (Mn)-Dissolved			99.2		%		80-120	24-OCT-18
Molybdenum (Mo)-Dissolved			101.6		%		80-120	24-OCT-18
Nickel (Ni)-Dissolved			98.2		%		80-120	24-OCT-18
Potassium (K)-Dissolved			104.3		%		80-120	24-OCT-18
Selenium (Se)-Dissolved			97.0		%		80-120	24-OCT-18
Silicon (Si)-Dissolved			95.1		%		60-140	24-OCT-18
Silver (Ag)-Dissolved			97.8		%		80-120	24-OCT-18
Sodium (Na)-Dissolved			102.0		%		80-120	24-OCT-18
Strontium (Sr)-Dissolved			96.9		%		80-120	24-OCT-18
Thallium (Tl)-Dissolved			100.6		%		80-120	24-OCT-18
Tin (Sn)-Dissolved			101.5		%		80-120	24-OCT-18
Titanium (Ti)-Dissolved			95.8		%		80-120	24-OCT-18
Uranium (U)-Dissolved			100.2		%		80-120	24-OCT-18
Vanadium (V)-Dissolved			101.1		%		80-120	24-OCT-18
Zinc (Zn)-Dissolved			95.3		%		80-120	24-OCT-18
WG2912253-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	24-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	24-OCT-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	24-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	24-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	24-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	24-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4295762								
WG2912253-1 MB		**NP**						
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	24-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	24-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	24-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	24-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	24-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	24-OCT-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	24-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	24-OCT-18
MET-T-CCMS-VA	**Water**							
Batch R4295236								
WG2908126-2 LCS								
Aluminum (Al)-Total			100.9		%		80-120	20-OCT-18
Antimony (Sb)-Total			104.2		%		80-120	20-OCT-18
Arsenic (As)-Total			97.8		%		80-120	20-OCT-18
Barium (Ba)-Total			101.0		%		80-120	20-OCT-18
Bismuth (Bi)-Total			99.98		%		80-120	20-OCT-18
Boron (B)-Total			103.0		%		80-120	20-OCT-18
Cadmium (Cd)-Total			98.8		%		80-120	20-OCT-18
Calcium (Ca)-Total			100.6		%		80-120	20-OCT-18
Chromium (Cr)-Total			100.3		%		80-120	20-OCT-18
Cobalt (Co)-Total			97.2		%		80-120	20-OCT-18
Copper (Cu)-Total			96.5		%		80-120	20-OCT-18
Iron (Fe)-Total			92.1		%		80-120	20-OCT-18
Lead (Pb)-Total			101.0		%		80-120	20-OCT-18
Lithium (Li)-Total			105.0		%		80-120	20-OCT-18
Magnesium (Mg)-Total			98.7		%		80-120	20-OCT-18
Manganese (Mn)-Total			98.6		%		80-120	20-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4295236								
WG2908126-2 LCS								
Molybdenum (Mo)-Total			105.6		%		80-120	20-OCT-18
Nickel (Ni)-Total			98.5		%		80-120	20-OCT-18
Potassium (K)-Total			100.3		%		80-120	20-OCT-18
Selenium (Se)-Total			97.2		%		80-120	20-OCT-18
Silicon (Si)-Total			97.3		%		80-120	20-OCT-18
Silver (Ag)-Total			101.0		%		80-120	20-OCT-18
Sodium (Na)-Total			99.1		%		80-120	20-OCT-18
Strontium (Sr)-Total			104.3		%		80-120	20-OCT-18
Thallium (Tl)-Total			98.5		%		80-120	20-OCT-18
Tin (Sn)-Total			96.5		%		80-120	20-OCT-18
Titanium (Ti)-Total			95.6		%		80-120	20-OCT-18
Uranium (U)-Total			102.6		%		80-120	20-OCT-18
Vanadium (V)-Total			98.3		%		80-120	20-OCT-18
Zinc (Zn)-Total			97.3		%		80-120	20-OCT-18
WG2908126-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	20-OCT-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	20-OCT-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	20-OCT-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	20-OCT-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	20-OCT-18
Boron (B)-Total			<0.010		mg/L		0.01	20-OCT-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	20-OCT-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	20-OCT-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	20-OCT-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	20-OCT-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	20-OCT-18
Iron (Fe)-Total			<0.010		mg/L		0.01	20-OCT-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	20-OCT-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	20-OCT-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	20-OCT-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	20-OCT-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	20-OCT-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	20-OCT-18
Potassium (K)-Total			<0.050		mg/L		0.05	20-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4295236								
WG2908126-1 MB								
Selenium (Se)-Total			<0.000050		mg/L		0.00005	20-OCT-18
Silicon (Si)-Total			<0.10		mg/L		0.1	20-OCT-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	20-OCT-18
Sodium (Na)-Total			<0.050		mg/L		0.05	20-OCT-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	20-OCT-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	20-OCT-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	20-OCT-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	20-OCT-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	20-OCT-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	20-OCT-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	20-OCT-18
NH3-L-F-CL	**Water**							
Batch R4295198								
WG2911823-6 LCS								
Ammonia as N			101.8		%		85-115	23-OCT-18
WG2911823-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	23-OCT-18
NO2-L-IC-N-CL	**Water**							
Batch R4288142								
WG2908495-2 LCS								
Nitrite (as N)			101.6		%		90-110	18-OCT-18
WG2908495-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-OCT-18
NO3-L-IC-N-CL	**Water**							
Batch R4288142								
WG2908495-2 LCS								
Nitrate (as N)			99.6		%		90-110	18-OCT-18
WG2908495-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-OCT-18
ORP-CL	**Water**							
Batch R4290387								
WG2909895-3 CRM		**CL-ORP**						
ORP			216		mV		210-230	21-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ORP-CL	**Water**							
Batch R4295222								
WG2912008-1 CRM		**CL-ORP**						
ORP			217		mV		210-230	23-OCT-18
P-T-L-COL-CL	**Water**							
Batch R4288870								
WG2908376-10 LCS								
Phosphorus (P)-Total			112.8		%		80-120	19-OCT-18
WG2908376-6 LCS								
Phosphorus (P)-Total			104.6		%		80-120	19-OCT-18
WG2908376-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	19-OCT-18
WG2908376-9 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	19-OCT-18
PH-CL	**Water**							
Batch R4292487								
WG2910195-11 LCS								
pH			7.00		pH		6.9-7.1	20-OCT-18
WG2910195-14 LCS								
pH			6.99		pH		6.9-7.1	20-OCT-18
PO4-DO-L-COL-CL	**Water**							
Batch R4285867								
WG2907305-26 LCS								
Orthophosphate-Dissolved (as P)			99.9		%		80-120	17-OCT-18
WG2907305-25 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-OCT-18
SO4-IC-N-CL	**Water**							
Batch R4288142								
WG2908495-2 LCS								
Sulfate (SO4)			100.4		%		90-110	18-OCT-18
WG2908495-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-OCT-18
SOLIDS-TDS-CL	**Water**							
Batch R4295238								
WG2909793-5 LCS								
Total Dissolved Solids			100.9		%		85-115	21-OCT-18
WG2909793-4 MB								
Total Dissolved Solids			<10		mg/L		10	21-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-CL	**Water**							
Batch R4296702								
WG2911487-2 LCS								
Total Dissolved Solids			97.3		%		85-115	23-OCT-18
WG2911487-1 MB								
Total Dissolved Solids			<10		mg/L		10	23-OCT-18
TKN-L-F-CL	**Water**							
Batch R4289276								
WG2906457-14 LCS								
Total Kjeldahl Nitrogen			106.7		%		75-125	19-OCT-18
WG2906457-13 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	19-OCT-18
TSS-L-CL	**Water**							
Batch R4296280								
WG2911332-24 LCS								
Total Suspended Solids			98.4		%		85-115	23-OCT-18
WG2911332-23 MB								
Total Suspended Solids			<1.0		mg/L		1	23-OCT-18
TURBIDITY-CL	**Water**							
Batch R4289142								
WG2907648-8 LCS								
Turbidity			97.0		%		85-115	18-OCT-18
WG2907648-7 MB								
Turbidity			<0.10		NTU		0.1	18-OCT-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	16-OCT-18 12:45	21-OCT-18 15:00	0.25	122	hours	EHTR-FM
	2	16-OCT-18 12:00	21-OCT-18 15:00	0.25	123	hours	EHTR-FM
	3	16-OCT-18 12:00	23-OCT-18 09:40	0.25	166	hours	EHTR-FM
	4	16-OCT-18 13:15	23-OCT-18 09:40	0.25	164	hours	EHTR-FM
	5	16-OCT-18 12:56	23-OCT-18 09:40	0.25	165	hours	EHTR-FM
pH							
	1	16-OCT-18 12:45	20-OCT-18 00:00	0.25	83	hours	EHTR-FM
	2	16-OCT-18 12:00	20-OCT-18 00:00	0.25	84	hours	EHTR-FM
	3	16-OCT-18 12:00	20-OCT-18 00:00	0.25	84	hours	EHTR-FM
	4	16-OCT-18 13:15	20-OCT-18 00:00	0.25	83	hours	EHTR-FM
	5	16-OCT-18 12:56	20-OCT-18 00:00	0.25	83	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2182357 were received on 17-OCT-18 09:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

Page

COC ID: QTR_WG_2018-10-01 | TURNAF | RUSH:

L2182357-COFC

PROJECT/CLIENT INFO								OTHER INFO			
Facility Name / Job#	Greenhills Operation			Lab				at / Distribution	Excel	PDF	EDD
Project Manager	Jeremy Enns			Lab C							
Email	Jeremy.Enns@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:			
Address	P.O. BOX 5000			Address	2559 29 Street NE			Email 3:	teckcoal@equisonline.com		X
City	Elkford	Province	BC	City	Calgary	Province	AB	PO number			
Postal Code	V0B1H0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada				
Phone Number	250-865-3341			Phone Number	403 407 1794						

SAMPLE DETAILS | ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-ROUTINE-VA	TECKCOAL-MET-T-VA					
FIELD FILTERED								Y	N	Y	N	Y	N	N					
PRESERVATIVE								H2SO4	H2SO4	HCL	HCL	HNO3	NONE	HNO3					
GH_POTW09_WG_2018-10-01_NP	GH_POTW09	WG		10/16/2018	12:45	G	7	1	1	1	1	1	1	1					
GH_GHER2_WG_2018-10-01_NP	GH_GHER2	WG		10/16/2018		G	6	1	1	1	1		1	1					
GH_GHLRP2_WG_2018-10-01_NP	GH_GHLRP2	WG		10/16/2018		G	6	1	1	1	1		1	1					
GH_POTW17_WG_2018-10-01_NP	GH_POTW17	WG		10/16/2018	13:15	G	7	1	1	1	1	1	1	1					
GH_POTW06_WG_2018-10-01_NP	GH_POTW06	WG		10/16/2018	12:56	G	7	1	1	1	1	1	1	1					
		WG				G													
		WG				G													
		WG				G													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
				10/17 9:10

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jaydon Francis	Mobile #	
Sampler's Signature		Date/Time	Oct 16 2018

7

TECK COAL LIMITED (GREENHILLS)
ATTN: Jeremy Enns
BOX 5000
ELKFORD BC V0B1H0

Date Received: 18-OCT-18
Report Date: 25-OCT-18 18:02 (MT)
Version: FINAL

Client Phone: 250-865-3305

Certificate of Analysis

Lab Work Order #: L2183572

Project P.O. #: VPO00540380
Job Reference: GREENHILLS OPERATIONS
C of C Numbers: QTR_WG_2018-10-01
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2183572-1 GH_MW-ERSC-1_WG_2018-10-01_NP							
Sampled By: CLIENT on 17-OCT-18 @ 13:05							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	2.12		0.50	mg/L		24-OCT-18	R4299048
Total Kjeldahl Nitrogen	0.129		0.050	mg/L		22-OCT-18	R4291748
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		24-OCT-18	R4295536
Total Organic Carbon	1.88		0.50	mg/L		24-OCT-18	R4299048
Dissolved Metals in Water							
Diss. Be (low) in Water by CRC ICPMS							
Beryllium (Be)-Dissolved	<0.020		0.020	ug/L	23-OCT-18	24-OCT-18	R4297456
Dissolved Metals Filtration Location	FIELD					23-OCT-18	R4295262
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	22-OCT-18	24-OCT-18	R4295536
Dissolved Mercury Filtration Location	FIELD					22-OCT-18	R4291747
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					23-OCT-18	R4295262
Aluminum (Al)-Dissolved	<0.0030		0.0030	mg/L	23-OCT-18	24-OCT-18	R4297456
Antimony (Sb)-Dissolved	0.00010		0.00010	mg/L	23-OCT-18	24-OCT-18	R4297456
Arsenic (As)-Dissolved	0.00024		0.00010	mg/L	23-OCT-18	24-OCT-18	R4297456
Barium (Ba)-Dissolved	0.134		0.00010	mg/L	23-OCT-18	24-OCT-18	R4297456
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	23-OCT-18	24-OCT-18	R4297456
Boron (B)-Dissolved	0.013		0.010	mg/L	23-OCT-18	24-OCT-18	R4297456
Cadmium (Cd)-Dissolved	0.0497		0.0050	ug/L	23-OCT-18	24-OCT-18	R4297456
Calcium (Ca)-Dissolved	84.5		0.050	mg/L	23-OCT-18	24-OCT-18	R4297456
Chromium (Cr)-Dissolved	0.00015		0.00010	mg/L	23-OCT-18	24-OCT-18	R4297456
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	23-OCT-18	24-OCT-18	R4297456
Copper (Cu)-Dissolved	0.00462		0.00050	mg/L	23-OCT-18	24-OCT-18	R4297456
Iron (Fe)-Dissolved	0.019		0.010	mg/L	23-OCT-18	24-OCT-18	R4297456
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	23-OCT-18	24-OCT-18	R4297456
Lithium (Li)-Dissolved	0.0075		0.0010	mg/L	23-OCT-18	24-OCT-18	R4297456
Magnesium (Mg)-Dissolved	24.4		0.10	mg/L	23-OCT-18	24-OCT-18	R4297456
Manganese (Mn)-Dissolved	0.00681		0.00010	mg/L	23-OCT-18	24-OCT-18	R4297456
Molybdenum (Mo)-Dissolved	0.00435		0.000050	mg/L	23-OCT-18	24-OCT-18	R4297456
Nickel (Ni)-Dissolved	0.00156		0.00050	mg/L	23-OCT-18	24-OCT-18	R4297456
Potassium (K)-Dissolved	0.753		0.050	mg/L	23-OCT-18	24-OCT-18	R4297456
Selenium (Se)-Dissolved	0.730		0.050	ug/L	23-OCT-18	24-OCT-18	R4297456
Silicon (Si)-Dissolved	5.70		0.050	mg/L	23-OCT-18	24-OCT-18	R4297456
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L	23-OCT-18	24-OCT-18	R4297456
Sodium (Na)-Dissolved	3.67		0.050	mg/L	23-OCT-18	24-OCT-18	R4297456
Strontium (Sr)-Dissolved	0.237		0.00020	mg/L	23-OCT-18	24-OCT-18	R4297456
Thallium (Tl)-Dissolved	0.000039		0.000010	mg/L	23-OCT-18	24-OCT-18	R4297456
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	23-OCT-18	24-OCT-18	R4297456
Titanium (Ti)-Dissolved	<0.010		0.010	mg/L	23-OCT-18	24-OCT-18	R4297456
Uranium (U)-Dissolved	0.000803		0.000010	mg/L	23-OCT-18	24-OCT-18	R4297456
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	23-OCT-18	24-OCT-18	R4297456
Zinc (Zn)-Dissolved	0.0019		0.0010	mg/L	23-OCT-18	24-OCT-18	R4297456
Hardness							
Hardness (as CaCO3)	311		0.50	mg/L		24-OCT-18	
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<1.0		1.0	mg/L		22-OCT-18	R4294875
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	314		1.0	mg/L		23-OCT-18	R4295716
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		23-OCT-18	R4295716

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2183572-1 GH_MW-ERSC-1_WG_2018-10-01_NP							
Sampled By: CLIENT on 17-OCT-18 @ 13:05							
Matrix: WG							
Alkalinity (Species) by Manual Titration							
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		23-OCT-18	R4295716
Alkalinity, Total (as CaCO3)	314		1.0	mg/L		23-OCT-18	R4295716
Ammonia, Total (as N)							
Ammonia as N	0.0471		0.0050	mg/L		24-OCT-18	R4296673
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		20-OCT-18	R4291093
Chloride in Water by IC							
Chloride (Cl)	1.15		0.50	mg/L		20-OCT-18	R4291093
Electrical Conductivity (EC)							
Conductivity (@ 25C)	569		2.0	uS/cm		23-OCT-18	R4295716
Fluoride in Water by IC							
Fluoride (F)	0.185		0.020	mg/L		20-OCT-18	R4291093
Ion Balance Calculation							
Ion Balance	96.1		-100	%		24-OCT-18	
Ion Balance Calculation							
Cation - Anion Balance	-2.0			%		24-OCT-18	
Anion Sum	6.67			meq/L		24-OCT-18	
Cation Sum	6.41			meq/L		24-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.0383		0.0050	mg/L		20-OCT-18	R4291093
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.0015		0.0010	mg/L		20-OCT-18	R4291093
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	0.0045		0.0010	mg/L		19-OCT-18	R4289032
Oxidation redution potential by elect.							
ORP	344		-1000	mV		23-OCT-18	R4295222
Phosphorus (P)-Total							
Phosphorus (P)-Total	0.0088		0.0020	mg/L		22-OCT-18	R4293368
Sulfate in Water by IC							
Sulfate (SO4)	16.6		0.30	mg/L		20-OCT-18	R4291093
Total Dissolved Solids							
Total Dissolved Solids	341	DLHC	20	mg/L		24-OCT-18	R4299539
Total Suspended Solids							
Total Suspended Solids	1.4		1.0	mg/L		23-OCT-18	R4296280
Turbidity							
Turbidity	0.51		0.10	NTU		19-OCT-18	R4289537
pH							
pH	7.92		0.10	pH		23-OCT-18	R4295716
L2183572-2 GH_GHER3_WG_2018-10-01_NP							
Sampled By: CLIENT on 17-OCT-18 @ 12:00							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	2.00		0.50	mg/L		24-OCT-18	R4299048
Total Kjeldahl Nitrogen	0.122		0.050	mg/L		22-OCT-18	R4291748
Total Organic Carbon	1.78		0.50	mg/L		24-OCT-18	R4299048
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	22-OCT-18	24-OCT-18	R4295536
Dissolved Mercury Filtration Location	FIELD					22-OCT-18	R4291747
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	322		0.50	mg/L		25-OCT-18	
Total Be (Low) in Water by CRC ICPMS							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2183572-2 GH_GHER3_WG_2018-10-01_NP							
Sampled By: CLIENT on 17-OCT-18 @ 12:00							
Matrix: WG							
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		23-OCT-18	R4295717
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		24-OCT-18	R4295536
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0070		0.0030	mg/L		23-OCT-18	R4295717
Antimony (Sb)-Total	0.00012		0.00010	mg/L		23-OCT-18	R4295717
Arsenic (As)-Total	0.00027		0.00010	mg/L		23-OCT-18	R4295717
Barium (Ba)-Total	0.129		0.00010	mg/L		23-OCT-18	R4295717
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		23-OCT-18	R4295717
Boron (B)-Total	0.014		0.010	mg/L		23-OCT-18	R4295717
Cadmium (Cd)-Total	0.0581		0.0050	ug/L		23-OCT-18	R4295717
Calcium (Ca)-Total	85.7		0.050	mg/L		23-OCT-18	R4295717
Chromium (Cr)-Total	0.00019		0.00010	mg/L		23-OCT-18	R4295717
Cobalt (Co)-Total	<0.10		0.10	ug/L		23-OCT-18	R4295717
Copper (Cu)-Total	0.00716		0.00050	mg/L		23-OCT-18	R4295717
Iron (Fe)-Total	0.027		0.010	mg/L		23-OCT-18	R4295717
Lead (Pb)-Total	<0.000050		0.000050	mg/L		23-OCT-18	R4295717
Lithium (Li)-Total	0.0080		0.0010	mg/L		23-OCT-18	R4295717
Magnesium (Mg)-Total	23.2		0.10	mg/L		23-OCT-18	R4295717
Manganese (Mn)-Total	0.00737		0.00010	mg/L		23-OCT-18	R4295717
Molybdenum (Mo)-Total	0.00428		0.000050	mg/L		23-OCT-18	R4295717
Nickel (Ni)-Total	0.00151		0.00050	mg/L		23-OCT-18	R4295717
Potassium (K)-Total	0.729		0.050	mg/L		23-OCT-18	R4295717
Selenium (Se)-Total	0.654		0.050	ug/L		23-OCT-18	R4295717
Silicon (Si)-Total	5.58		0.10	mg/L		23-OCT-18	R4295717
Silver (Ag)-Total	0.000017		0.000010	mg/L		23-OCT-18	R4295717
Sodium (Na)-Total	3.41		0.050	mg/L		23-OCT-18	R4295717
Strontium (Sr)-Total	0.227		0.00020	mg/L		23-OCT-18	R4295717
Thallium (Tl)-Total	0.000042		0.000010	mg/L		23-OCT-18	R4295717
Tin (Sn)-Total	<0.00010		0.00010	mg/L		23-OCT-18	R4295717
Titanium (Ti)-Total	<0.010		0.010	mg/L		23-OCT-18	R4295717
Uranium (U)-Total	0.000831		0.000010	mg/L		23-OCT-18	R4295717
Vanadium (V)-Total	<0.00050		0.00050	mg/L		23-OCT-18	R4295717
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		23-OCT-18	R4295717
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	<1.0		1.0	mg/L		22-OCT-18	R4294875
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	313		1.0	mg/L		23-OCT-18	R4295716
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		23-OCT-18	R4295716
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		23-OCT-18	R4295716
Alkalinity, Total (as CaCO3)	313		1.0	mg/L		23-OCT-18	R4295716
Ammonia, Total (as N)							
Ammonia as N	0.0345		0.0050	mg/L		24-OCT-18	R4296673
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		20-OCT-18	R4291093
Chloride in Water by IC							
Chloride (Cl)	1.15		0.50	mg/L		20-OCT-18	R4291093
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	LAB					24-OCT-18	R4298110
Calcium (Ca)-Dissolved	88.7		0.050	mg/L		24-OCT-18	R4296467
Magnesium (Mg)-Dissolved	24.5		0.0050	mg/L		24-OCT-18	R4296467

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2183572-2 GH_GHER3_WG_2018-10-01_NP							
Sampled By: CLIENT on 17-OCT-18 @ 12:00							
Matrix: WG							
Dissolved Metals in Water by CRC ICPMS							
Potassium (K)-Dissolved	0.827		0.050	mg/L		24-OCT-18	R4296467
Sodium (Na)-Dissolved	3.95		0.050	mg/L		24-OCT-18	R4296467
Electrical Conductivity (EC)							
Conductivity (@ 25C)	569		2.0	uS/cm		23-OCT-18	R4295716
Fluoride in Water by IC							
Fluoride (F)	0.180		0.020	mg/L		20-OCT-18	R4291093
Ion Balance Calculation							
Ion Balance	99.9		-100	%		25-OCT-18	
Ion Balance Calculation							
Cation - Anion Balance	-0.1			%		25-OCT-18	
Anion Sum	6.64			meq/L		25-OCT-18	
Cation Sum	6.64			meq/L		25-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	0.0437		0.0050	mg/L		20-OCT-18	R4291093
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.0014		0.0010	mg/L		20-OCT-18	R4291093
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	0.0044		0.0010	mg/L		19-OCT-18	R4289032
Oxidation redution potential by elect.							
ORP	324		-1000	mV		23-OCT-18	R4295222
Phosphorus (P)-Total							
Phosphorus (P)-Total	0.0095		0.0020	mg/L		22-OCT-18	R4293368
Sulfate in Water by IC							
Sulfate (SO4)	16.6		0.30	mg/L		20-OCT-18	R4291093
Total Dissolved Solids							
Total Dissolved Solids	343	DLHC	20	mg/L		24-OCT-18	R4299539
Total Suspended Solids							
Total Suspended Solids	1.5		1.0	mg/L		23-OCT-18	R4296280
Turbidity							
Turbidity	0.60		0.10	NTU		19-OCT-18	R4289537
pH							
pH	8.03		0.10	pH		23-OCT-18	R4295716
L2183572-3 GH_GHLRP3_WG_2018-10-01_NP							
Sampled By: CLIENT on 17-OCT-18 @ 12:00							
Matrix: WG							
Miscellaneous Parameters							
Dissolved Organic Carbon	<0.50		0.50	mg/L		24-OCT-18	R4299048
Total Kjeldahl Nitrogen	0.135		0.050	mg/L		22-OCT-18	R4291748
Total Organic Carbon	<0.50		0.50	mg/L		24-OCT-18	R4299048
Diss. Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	22-OCT-18	24-OCT-18	R4295536
Dissolved Mercury Filtration Location	FIELD					22-OCT-18	R4291747
Total Metals in Water							
Hardness							
Hardness (as CaCO3)	<0.50		0.50	mg/L		25-OCT-18	
Total Be (Low) in Water by CRC ICPMS							
Beryllium (Be)-Total	<0.020		0.020	ug/L		23-OCT-18	R4295717
Total Mercury in Water by CVAAS or CVAFS							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		24-OCT-18	R4295536
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L		23-OCT-18	R4295717
Antimony (Sb)-Total	<0.00010		0.00010	mg/L		23-OCT-18	R4295717

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2183572-3 GH_GHLRP3_WG_2018-10-01_NP							
Sampled By: CLIENT on 17-OCT-18 @ 12:00							
Matrix: WG							
Total Metals in Water by CRC ICPMS							
Arsenic (As)-Total	<0.00010		0.00010	mg/L		23-OCT-18	R4295717
Barium (Ba)-Total	<0.00010		0.00010	mg/L		23-OCT-18	R4295717
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L		23-OCT-18	R4295717
Boron (B)-Total	<0.010		0.010	mg/L		23-OCT-18	R4295717
Cadmium (Cd)-Total	<0.0050		0.0050	ug/L		23-OCT-18	R4295717
Calcium (Ca)-Total	<0.050		0.050	mg/L		23-OCT-18	R4295717
Chromium (Cr)-Total	<0.00010		0.00010	mg/L		23-OCT-18	R4295717
Cobalt (Co)-Total	<0.10		0.10	ug/L		23-OCT-18	R4295717
Copper (Cu)-Total	<0.00050		0.00050	mg/L		23-OCT-18	R4295717
Iron (Fe)-Total	<0.010		0.010	mg/L		23-OCT-18	R4295717
Lead (Pb)-Total	<0.000050		0.000050	mg/L		23-OCT-18	R4295717
Lithium (Li)-Total	<0.0010		0.0010	mg/L		23-OCT-18	R4295717
Magnesium (Mg)-Total	<0.10		0.10	mg/L		23-OCT-18	R4295717
Manganese (Mn)-Total	<0.00010		0.00010	mg/L		23-OCT-18	R4295717
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L		23-OCT-18	R4295717
Nickel (Ni)-Total	<0.00050		0.00050	mg/L		23-OCT-18	R4295717
Potassium (K)-Total	<0.050		0.050	mg/L		23-OCT-18	R4295717
Selenium (Se)-Total	<0.050		0.050	ug/L		23-OCT-18	R4295717
Silicon (Si)-Total	<0.10		0.10	mg/L		23-OCT-18	R4295717
Silver (Ag)-Total	<0.000010		0.000010	mg/L		23-OCT-18	R4295717
Sodium (Na)-Total	<0.050		0.050	mg/L		23-OCT-18	R4295717
Strontium (Sr)-Total	<0.00020		0.00020	mg/L		23-OCT-18	R4295717
Thallium (Tl)-Total	<0.000010		0.000010	mg/L		23-OCT-18	R4295717
Tin (Sn)-Total	<0.00010		0.00010	mg/L		23-OCT-18	R4295717
Titanium (Ti)-Total	<0.010		0.010	mg/L		23-OCT-18	R4295717
Uranium (U)-Total	<0.000010		0.000010	mg/L		23-OCT-18	R4295717
Vanadium (V)-Total	<0.00050		0.00050	mg/L		23-OCT-18	R4295717
Zinc (Zn)-Total	<0.0030		0.0030	mg/L		23-OCT-18	R4295717
Routine for Teck Coal							
Acidity by Automatic Titration							
Acidity (as CaCO3)	2.2		1.0	mg/L		22-OCT-18	R4294875
Alkalinity (Species) by Manual Titration							
Alkalinity, Bicarbonate (as CaCO3)	<1.0		1.0	mg/L		23-OCT-18	R4295716
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L		23-OCT-18	R4295716
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L		23-OCT-18	R4295716
Alkalinity, Total (as CaCO3)	<1.0		1.0	mg/L		23-OCT-18	R4295716
Ammonia, Total (as N)							
Ammonia as N	0.0415		0.0050	mg/L		24-OCT-18	R4296673
Bromide in Water by IC (Low Level)							
Bromide (Br)	<0.050		0.050	mg/L		20-OCT-18	R4291093
Chloride in Water by IC							
Chloride (Cl)	<0.50		0.50	mg/L		20-OCT-18	R4291093
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	LAB					24-OCT-18	R4298110
Calcium (Ca)-Dissolved	<0.050		0.050	mg/L		24-OCT-18	R4296467
Magnesium (Mg)-Dissolved	<0.0050		0.0050	mg/L		24-OCT-18	R4296467
Potassium (K)-Dissolved	<0.050		0.050	mg/L		24-OCT-18	R4296467
Sodium (Na)-Dissolved	<0.050		0.050	mg/L		24-OCT-18	R4296467
Electrical Conductivity (EC)							
Conductivity (@ 25C)	<2.0		2.0	uS/cm		23-OCT-18	R4295716
Fluoride in Water by IC							
Fluoride (F)	<0.020		0.020	mg/L		20-OCT-18	R4291093

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2183572-3 GH_GHLRP3_WG_2018-10-01_NP							
Sampled By: CLIENT on 17-OCT-18 @ 12:00							
Matrix: WG							
Ion Balance Calculation							
Ion Balance	6560		-100	%		25-OCT-18	
Ion Balance Calculation							
Cation - Anion Balance	97.0			%		25-OCT-18	
Anion Sum	<0.10			meq/L		25-OCT-18	
Cation Sum	<0.10			meq/L		25-OCT-18	
Nitrate in Water by IC (Low Level)							
Nitrate (as N)	<0.0050		0.0050	mg/L		20-OCT-18	R4291093
Nitrite in Water by IC (Low Level)							
Nitrite (as N)	0.0011		0.0010	mg/L		20-OCT-18	R4291093
Orthophosphate-Dissolved (as P)							
Orthophosphate-Dissolved (as P)	0.0010		0.0010	mg/L		19-OCT-18	R4289032
Oxidation redution potential by elect.							
ORP	465		-1000	mV		23-OCT-18	R4295222
Phosphorus (P)-Total							
Phosphorus (P)-Total	0.0032		0.0020	mg/L		22-OCT-18	R4293368
Sulfate in Water by IC							
Sulfate (SO4)	<0.30		0.30	mg/L		20-OCT-18	R4291093
Total Dissolved Solids							
Total Dissolved Solids	<10		10	mg/L		24-OCT-18	R4299539
Total Suspended Solids							
Total Suspended Solids	<1.0		1.0	mg/L		23-OCT-18	R4296280
Turbidity							
Turbidity	<0.10		0.10	NTU		19-OCT-18	R4289537
pH							
pH	5.66		0.10	pH		23-OCT-18	R4295716

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-CL	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

QTR_WG_2018-10-01

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TECK COAL LIMITED (GREENHILLS)
BOX 5000
ELKFORD BC V0B1H0
Contact: Jeremy Enns

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4294875								
WG2911230-18 DUP		**L2183572-3**						
Acidity (as CaCO3)		2.2	2.1		mg/L	2.8	20	22-OCT-18
WG2911230-14 LCS								
Acidity (as CaCO3)			106.0		%		85-115	22-OCT-18
WG2911230-17 LCS								
Acidity (as CaCO3)			101.5		%		85-115	22-OCT-18
WG2911230-13 MB								
Acidity (as CaCO3)			1.7		mg/L		2	22-OCT-18
WG2911230-16 MB								
Acidity (as CaCO3)			1.7		mg/L		2	22-OCT-18
ALK-MAN-CL	**Water**							
Batch R4295716								
WG2912069-11 LCS								
Alkalinity, Total (as CaCO3)			99.1		%		85-115	23-OCT-18
WG2912069-14 LCS								
Alkalinity, Total (as CaCO3)			102.1		%		85-115	23-OCT-18
WG2912069-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	23-OCT-18
WG2912069-13 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	23-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4297456								
WG2912017-2 LCS								
Beryllium (Be)-Dissolved			100.0		%		80-120	24-OCT-18
WG2912017-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	24-OCT-18
BE-T-L-CCMS-VA	**Water**							
Batch R4295717								
WG2911766-2 LCS								
Beryllium (Be)-Total			99.6		%		80-120	23-OCT-18
WG2911766-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	23-OCT-18
BR-L-IC-N-CL	**Water**							
Batch R4291093								
WG2910361-3 DUP		**L2183572-3**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2910361-2 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-CL	**Water**							
Batch R4291093								
WG2910361-2 LCS								
Bromide (Br)			101.4		%		85-115	20-OCT-18
WG2910361-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	20-OCT-18
WG2910361-4 MS		**L2183572-3**						
Bromide (Br)			101.8		%		75-125	20-OCT-18
Bromide (Br)			101.8		%		75-125	20-OCT-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4299048								
WG2913868-6 LCS								
Dissolved Organic Carbon			96.7		%		80-120	24-OCT-18
WG2913868-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	24-OCT-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4299048								
WG2913868-6 LCS								
Total Organic Carbon			100.8		%		80-120	24-OCT-18
WG2913868-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	24-OCT-18
CL-IC-N-CL	**Water**							
Batch R4291093								
WG2910361-3 DUP		**L2183572-3**						
Chloride (Cl)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2910361-2 LCS								
Chloride (Cl)			99.7		%		90-110	20-OCT-18
WG2910361-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	20-OCT-18
WG2910361-4 MS		**L2183572-3**						
Chloride (Cl)			100.8		%		75-125	20-OCT-18
Chloride (Cl)			100.8		%		75-125	20-OCT-18
EC-L-PCT-CL	**Water**							
Batch R4295716								
WG2912069-11 LCS								
Conductivity (@ 25C)			99.4		%		90-110	23-OCT-18
WG2912069-14 LCS								
Conductivity (@ 25C)			101.0		%		90-110	23-OCT-18
WG2912069-10 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-L-PCT-CL	**Water**							
Batch R4295716								
WG2912069-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	23-OCT-18
WG2912069-13 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	23-OCT-18
F-IC-N-CL	**Water**							
Batch R4291093								
WG2910361-3 DUP		**L2183572-3**						
Fluoride (F)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2910361-2 LCS								
Fluoride (F)			103.4		%		90-110	20-OCT-18
WG2910361-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	20-OCT-18
WG2910361-4 MS		**L2183572-3**						
Fluoride (F)			105.8		%		75-125	20-OCT-18
Fluoride (F)			105.8		%		75-125	20-OCT-18
HG-D-CVAA-VA	**Water**							
Batch R4293929								
WG2910516-2 LCS								
Mercury (Hg)-Dissolved			97.0		%		80-120	23-OCT-18
WG2910516-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	23-OCT-18
Batch R4295536								
WG2910516-3 DUP		**L2183572-2**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	24-OCT-18
WG2910516-4 MS		**L2183572-1**						
Mercury (Hg)-Dissolved			81.8		%		70-130	24-OCT-18
HG-T-CVAA-VA	**Water**							
Batch R4295536								
WG2912329-2 LCS								
Mercury (Hg)-Total			100.7		%		80-120	24-OCT-18
WG2912329-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	24-OCT-18
MET-D-CCMS-CL	**Water**							
Batch R4296467								
WG2912940-2 LCS		**TMRM**						
Calcium (Ca)-Dissolved			90.9		%		80-120	24-OCT-18
Magnesium (Mg)-Dissolved			97.9		%		80-120	24-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R4296467								
WG2912940-2 LCS		**TMRM**						
Potassium (K)-Dissolved			97.9		%		80-120	24-OCT-18
Sodium (Na)-Dissolved			95.2		%		80-120	24-OCT-18
WG2912940-6 LCS		**TMRM**						
Calcium (Ca)-Dissolved			90.7		%		80-120	24-OCT-18
Magnesium (Mg)-Dissolved			96.0		%		80-120	24-OCT-18
Potassium (K)-Dissolved			95.5		%		80-120	24-OCT-18
Sodium (Na)-Dissolved			95.0		%		80-120	24-OCT-18
WG2912940-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
WG2912940-5 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
WG2912940-9 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
WG2912940-8 MS		**L2183572-2**						
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	24-OCT-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	24-OCT-18
Potassium (K)-Dissolved			102.2		%		70-130	24-OCT-18
Sodium (Na)-Dissolved			100.2		%		70-130	24-OCT-18
MET-D-CCMS-VA	**Water**							
Batch R4297456								
WG2912017-2 LCS								
Aluminum (Al)-Dissolved			102.4		%		80-120	24-OCT-18
Antimony (Sb)-Dissolved			105.4		%		80-120	24-OCT-18
Arsenic (As)-Dissolved			100.4		%		80-120	24-OCT-18
Barium (Ba)-Dissolved			101.0		%		80-120	24-OCT-18
Bismuth (Bi)-Dissolved			100.6		%		80-120	24-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4297456								
WG2912017-2 LCS								
Boron (B)-Dissolved			90.9		%		80-120	24-OCT-18
Cadmium (Cd)-Dissolved			96.4		%		80-120	24-OCT-18
Calcium (Ca)-Dissolved			99.2		%		80-120	24-OCT-18
Chromium (Cr)-Dissolved			101.2		%		80-120	24-OCT-18
Cobalt (Co)-Dissolved			100.2		%		80-120	24-OCT-18
Copper (Cu)-Dissolved			99.6		%		80-120	24-OCT-18
Iron (Fe)-Dissolved			97.6		%		80-120	24-OCT-18
Lead (Pb)-Dissolved			99.7		%		80-120	24-OCT-18
Lithium (Li)-Dissolved			94.7		%		80-120	24-OCT-18
Magnesium (Mg)-Dissolved			106.0		%		80-120	24-OCT-18
Manganese (Mn)-Dissolved			99.9		%		80-120	24-OCT-18
Molybdenum (Mo)-Dissolved			107.0		%		80-120	24-OCT-18
Nickel (Ni)-Dissolved			101.2		%		80-120	24-OCT-18
Potassium (K)-Dissolved			100.9		%		80-120	24-OCT-18
Selenium (Se)-Dissolved			97.0		%		80-120	24-OCT-18
Silicon (Si)-Dissolved			98.8		%		60-140	24-OCT-18
Silver (Ag)-Dissolved			100.0		%		80-120	24-OCT-18
Sodium (Na)-Dissolved			103.4		%		80-120	24-OCT-18
Strontium (Sr)-Dissolved			104.9		%		80-120	24-OCT-18
Thallium (Tl)-Dissolved			98.4		%		80-120	24-OCT-18
Tin (Sn)-Dissolved			97.1		%		80-120	24-OCT-18
Titanium (Ti)-Dissolved			99.4		%		80-120	24-OCT-18
Uranium (U)-Dissolved			97.7		%		80-120	24-OCT-18
Vanadium (V)-Dissolved			102.9		%		80-120	24-OCT-18
Zinc (Zn)-Dissolved			98.7		%		80-120	24-OCT-18
WG2912017-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	24-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	24-OCT-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	24-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4297456								
WG2912017-1 MB		**NP**						
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	24-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	24-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	24-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-OCT-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	24-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	24-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	24-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	24-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	24-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	24-OCT-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	24-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	24-OCT-18
MET-T-CCMS-VA	**Water**							
Batch R4295717								
WG2911766-2 LCS								
Aluminum (Al)-Total			99.0		%		80-120	23-OCT-18
Antimony (Sb)-Total			104.8		%		80-120	23-OCT-18
Arsenic (As)-Total			97.6		%		80-120	23-OCT-18
Barium (Ba)-Total			97.5		%		80-120	23-OCT-18
Bismuth (Bi)-Total			95.9		%		80-120	23-OCT-18
Boron (B)-Total			100.9		%		80-120	23-OCT-18
Cadmium (Cd)-Total			97.0		%		80-120	23-OCT-18
Calcium (Ca)-Total			99.7		%		80-120	23-OCT-18
Chromium (Cr)-Total			97.7		%		80-120	23-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4295717								
WG2911766-2 LCS								
Cobalt (Co)-Total			94.4		%		80-120	23-OCT-18
Copper (Cu)-Total			95.8		%		80-120	23-OCT-18
Iron (Fe)-Total			95.8		%		80-120	23-OCT-18
Lead (Pb)-Total			95.8		%		80-120	23-OCT-18
Lithium (Li)-Total			100.1		%		80-120	23-OCT-18
Magnesium (Mg)-Total			101.0		%		80-120	23-OCT-18
Manganese (Mn)-Total			97.2		%		80-120	23-OCT-18
Molybdenum (Mo)-Total			99.0		%		80-120	23-OCT-18
Nickel (Ni)-Total			96.6		%		80-120	23-OCT-18
Potassium (K)-Total			97.6		%		80-120	23-OCT-18
Selenium (Se)-Total			99.1		%		80-120	23-OCT-18
Silicon (Si)-Total			99.6		%		80-120	23-OCT-18
Silver (Ag)-Total			91.1		%		80-120	23-OCT-18
Sodium (Na)-Total			93.2		%		80-120	23-OCT-18
Strontium (Sr)-Total			95.6		%		80-120	23-OCT-18
Thallium (Tl)-Total			97.6		%		80-120	23-OCT-18
Tin (Sn)-Total			97.7		%		80-120	23-OCT-18
Titanium (Ti)-Total			95.5		%		80-120	23-OCT-18
Uranium (U)-Total			93.5		%		80-120	23-OCT-18
Vanadium (V)-Total			97.8		%		80-120	23-OCT-18
Zinc (Zn)-Total			99.97		%		80-120	23-OCT-18
WG2911766-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	23-OCT-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	23-OCT-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	23-OCT-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	23-OCT-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	23-OCT-18
Boron (B)-Total			<0.010		mg/L		0.01	23-OCT-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	23-OCT-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	23-OCT-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	23-OCT-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	23-OCT-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	23-OCT-18
Iron (Fe)-Total			<0.010		mg/L		0.01	23-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4295717								
WG2911766-1 MB								
Lead (Pb)-Total			<0.000050		mg/L		0.00005	23-OCT-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	23-OCT-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	23-OCT-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	23-OCT-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	23-OCT-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	23-OCT-18
Potassium (K)-Total			<0.050		mg/L		0.05	23-OCT-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	23-OCT-18
Silicon (Si)-Total			<0.10		mg/L		0.1	23-OCT-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	23-OCT-18
Sodium (Na)-Total			<0.050		mg/L		0.05	23-OCT-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	23-OCT-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	23-OCT-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	23-OCT-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	23-OCT-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	23-OCT-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	23-OCT-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	23-OCT-18
NH3-L-F-CL	**Water**							
Batch R4296673								
WG2912993-14 LCS								
Ammonia as N			103.7		%		85-115	24-OCT-18
WG2912993-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	24-OCT-18
NO2-L-IC-N-CL	**Water**							
Batch R4291093								
WG2910361-3 DUP		**L2183572-3**						
Nitrite (as N)		0.0011	<0.0010	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2910361-2 LCS								
Nitrite (as N)			104.4		%		90-110	20-OCT-18
WG2910361-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	20-OCT-18
WG2910361-4 MS		**L2183572-3**						
Nitrite (as N)			104.5		%		75-125	20-OCT-18
Nitrite (as N)			104.5		%		75-125	20-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4291093								
WG2910361-3 DUP		**L2183572-3**						
Nitrate (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2910361-2 LCS								
Nitrate (as N)			98.5		%		90-110	20-OCT-18
WG2910361-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	20-OCT-18
WG2910361-4 MS		**L2183572-3**						
Nitrate (as N)			99.7		%		75-125	20-OCT-18
Nitrate (as N)			99.7		%		75-125	20-OCT-18
ORP-CL	**Water**							
Batch R4295222								
WG2912008-4 CRM		**CL-ORP**						
ORP			213		mV		210-230	23-OCT-18
P-T-L-COL-CL	**Water**							
Batch R4293368								
WG2910813-14 LCS								
Phosphorus (P)-Total			109.0		%		80-120	22-OCT-18
WG2910813-13 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	22-OCT-18
PH-CL	**Water**							
Batch R4295716								
WG2912069-11 LCS								
pH			6.98		pH		6.9-7.1	23-OCT-18
WG2912069-14 LCS								
pH			6.98		pH		6.9-7.1	23-OCT-18
PO4-DO-L-COL-CL	**Water**							
Batch R4289032								
WG2908839-6 LCS								
Orthophosphate-Dissolved (as P)			105.3		%		80-120	19-OCT-18
WG2908839-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	19-OCT-18
SO4-IC-N-CL	**Water**							
Batch R4291093								
WG2910361-3 DUP		**L2183572-3**						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2910361-2 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-CL	**Water**							
Batch R4291093								
WG2910361-2 LCS								
Sulfate (SO4)			100.4		%		90-110	20-OCT-18
WG2910361-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	20-OCT-18
WG2910361-4 MS		**L2183572-3**						
Sulfate (SO4)			101.3		%		75-125	20-OCT-18
Sulfate (SO4)			101.3		%		75-125	20-OCT-18
SOLIDS-TDS-CL	**Water**							
Batch R4299539								
WG2912468-3 DUP		**L2183572-2**						
Total Dissolved Solids		343	345		mg/L	0.6	20	24-OCT-18
WG2912468-2 LCS								
Total Dissolved Solids			101.7		%		85-115	24-OCT-18
WG2912468-1 MB								
Total Dissolved Solids			<10		mg/L		10	24-OCT-18
TKN-L-F-CL	**Water**							
Batch R4291748								
WG2908924-10 LCS								
Total Kjeldahl Nitrogen			113.3		%		75-125	22-OCT-18
WG2908924-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	22-OCT-18
TSS-L-CL	**Water**							
Batch R4296280								
WG2911332-28 LCS								
Total Suspended Solids			94.3		%		85-115	23-OCT-18
WG2911332-27 MB								
Total Suspended Solids			<1.0		mg/L		1	23-OCT-18
TURBIDITY-CL	**Water**							
Batch R4289537								
WG2908994-9 DUP		**L2183572-2**						
Turbidity		0.60	0.59		NTU	2.0	15	19-OCT-18
WG2908994-5 LCS								
Turbidity			97.0		%		85-115	19-OCT-18
WG2908994-8 LCS								
Turbidity			97.5		%		85-115	19-OCT-18
WG2908994-4 MB								
Turbidity			<0.10		NTU		0.1	19-OCT-18
WG2908994-7								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-CL	**Water**							
Batch R4289537								
WG2908994-7 MB								
Turbidity			<0.10		NTU		0.1	19-OCT-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	17-OCT-18 13:05	23-OCT-18 13:00	0.25	144	hours	EHTR-FM
	2	17-OCT-18 12:00	23-OCT-18 13:00	0.25	145	hours	EHTR-FM
	3	17-OCT-18 12:00	23-OCT-18 13:00	0.25	145	hours	EHTR-FM
pH							
	1	17-OCT-18 13:05	23-OCT-18 00:00	0.25	131	hours	EHTR-FM
	2	17-OCT-18 12:00	23-OCT-18 00:00	0.25	132	hours	EHTR-FM
	3	17-OCT-18 12:00	23-OCT-18 00:00	0.25	132	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2183572 were received on 18-OCT-18 09:15.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2183572-COFC

COC ID:	QTR_WG_2018-10-01	TURNAROUND T		USH:	

PROJECT/CLIENT INFO						LAB INFO				
Facility Name / Job#	Greenhills Operation			Lab Name	ALS		bution	Excel	PDF	EDD
Project Manager	Jeremy Enns			Lab Contact	Lyu					
Email	Jeremy.Enns@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com	Email 2:				
Address	P.O. BOX 5000			Address	2559 29 Street NE	Email 3:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Calgary	Province	AB	PO number		
Postal Code	V0B1H0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada			
Phone Number	250-865-3341			Phone Number	403 407 1794					

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-ROUTINE-VA	TECKCOAL-MET-T-VA					
	FIL								Y	N	Y	N	Y	N	N					
	PRESERV								H2SO4	H2SO4	HCL	HCL	HNO3	NONE	HNO3					
1	GH_MW-ERSC-1_WG_2018-10-01_NP	GH_MW-ERSC-1	WG		10/17/2018	13:05	G	6	1	1	1	1	1	1						
	~~GH_MW-C_WG_2018-10-01_NP~~	~~GH_MW-C~~	~~WG~~		~~10/17/2018~~		~~G~~	~~6~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~						
	~~GH_MW-RLP_WG_2018-10-01_NP~~	~~GH_MW-RLP~~	~~WG~~		~~10/17/2018~~		~~G~~	~~6~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~						
2	GH_GHER3_WG_2018-10-01_NP	GH_GHER3	WG		10/17/2018		G	6	1	1	1	1		1	1					
3	GH_GHLRP3_WG_2018-10-01_NP	GH_GHLRP3	WG		10/17/2018		G	6	1	1	1	1		1	1					
			WG				G													
			WG				G													
			WG				G													
			WG				G													
			WG				G													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
				10/18 9:15

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

10

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 15-FEB-18
Report Date: 23-FEB-18 17:59 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2057053

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180214Q1GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2057053-1	L2057053-2	L2057053-3		
	Description	WG	WG	WG		
	Sampled Date	14-FEB-18	14-FEB-18	14-FEB-18		
	Sampled Time	12:30	12:20	13:50		
	Client ID	EV_WH50GW_WG_2018-02_NP	EV_RCSGW_WG_2018-02_NP	EV_BRGW_WG_2018-02_NP		
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0		
	Conductivity (@ 25C) (uS/cm)	563	2420	1260		
	Hardness (as CaCO3) (mg/L)	282	1570	683		
	pH (pH)	8.04	8.06	8.08		
	ORP (mV)	462	309	271		
	Total Suspended Solids (mg/L)	6.2	<1.0	<1.0		
	Total Dissolved Solids (mg/L)	361 DLHC	2120 DLHC	934 DLHC		
	Turbidity (NTU)	13.7	0.11	0.33		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	1.8	8.9	8.2		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	219	308	315		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	219	308	315		
	Ammonia as N (mg/L)	0.0079	0.0086	0.0092		
	Bromide (Br) (mg/L)	<0.050	<0.25 DLHC	0.412		
	Chloride (Cl) (mg/L)	2.36	10.5 DLHC	43.2		
	Fluoride (F) (mg/L)	0.098	<0.10 DLHC	0.096		
	Ion Balance (%)	83.6	96.6	93.6		
	Nitrate (as N) (mg/L)	1.87	35.0 DLHC	4.90		
	Nitrite (as N) (mg/L)	<0.0010	0.103 DLHC	<0.0010		
	Total Kjeldahl Nitrogen (mg/L)	0.088 RHR	<0.10 TKNI	<0.10 TKNI		
	Orthophosphate-Dissolved (as P) (mg/L)	0.0038	0.0028	0.0020		
	Phosphorus (P)-Total (mg/L)	0.0149	0.0033	0.0019		
	Sulfate (SO4) (mg/L)	114	1140 DLHC	346		
	Anion Sum (meq/L)	6.95	32.8	15.1		
	Cation Sum (meq/L)	5.81	31.7	14.1		
	Cation - Anion Balance (%)	-8.9	-1.7	-3.3		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.68	0.83	0.57		
	Total Organic Carbon (mg/L)	0.74	1.08	0.69		
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	0.0253	<0.0030		
	Antimony (Sb)-Dissolved (mg/L)	0.00013	0.00025	<0.00020 DLA		
	Arsenic (As)-Dissolved (mg/L)	0.00011	<0.00020 DLA	<0.00020 DLA		
	Barium (Ba)-Dissolved (mg/L)	0.108	0.0466	0.0749		
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.040 DLA	<0.040 DLA		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2057053-1	L2057053-2	L2057053-3		
	Description	WG	WG	WG		
	Sampled Date	14-FEB-18	14-FEB-18	14-FEB-18		
	Sampled Time	12:30	12:20	13:50		
	Client ID	EV_WH50GW_WG_2018-02_NP	EV_RCSGW_WG_2018-02_NP	EV_BRGW_WG_2018-02_NP		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.00010 DLA	<0.00010 DLA		
	Boron (B)-Dissolved (mg/L)	<0.010	0.021	0.037		
	Cadmium (Cd)-Dissolved (ug/L)	0.0193	0.230	0.055		
	Calcium (Ca)-Dissolved (mg/L)	70.7	355	183		
	Chromium (Cr)-Dissolved (mg/L)	0.00015	<0.00020 DLA	<0.00020 DLA		
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.20 DLA	<0.20 DLA		
	Copper (Cu)-Dissolved (mg/L)	<0.00050	0.139	0.00064		
	Iron (Fe)-Dissolved (mg/L)	0.019	<0.020 DLA	0.023		
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.00067	<0.00010 DLA		
	Lithium (Li)-Dissolved (mg/L)	0.0090	0.0683	0.0574		
	Magnesium (Mg)-Dissolved (mg/L)	25.6	166	55.0		
	Manganese (Mn)-Dissolved (mg/L)	0.00279	0.00069	0.00218		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.000988	0.00167	0.00067		
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.0033	0.0027		
	Potassium (K)-Dissolved (mg/L)	0.814	3.27	2.13		
	Selenium (Se)-Dissolved (ug/L)	13.4	193	23.7		
	Silicon (Si)-Dissolved (mg/L)	2.03	4.61	3.46		
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000020 DLA	<0.000020 DLA		
	Sodium (Na)-Dissolved (mg/L)	3.55	5.32	9.75		
	Strontium (Sr)-Dissolved (mg/L)	0.160	0.429	0.394		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000020 DLA	<0.000020 DLA		
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	<0.00020 DLA		
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	0.00131	0.00759	0.00184		
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.0010 DLA	<0.0010 DLA		
	Zinc (Zn)-Dissolved (mg/L)	<0.0030	0.0636	<0.0030		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Titanium (Ti)-Dissolved	MES	L2057053-1, -2, -3
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L2057053-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2057053-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2057053-1, -2, -3
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2057053-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2057053-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2057053-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RHR	Reported Highest Result: Sample is not homogenous.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

Reference Information

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

Reference Information

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180214Q1GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R3967079								
WG2719909-2 LCS								
Acidity (as CaCO3)			108.7		%		85-115	21-FEB-18
WG2719909-1 MB								
Acidity (as CaCO3)			1.6		mg/L		2	21-FEB-18
ALK-MAN-CL	**Water**							
Batch R3966912								
WG2719689-23 LCS								
Alkalinity, Total (as CaCO3)			109.9		%		85-115	20-FEB-18
WG2719689-22 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	20-FEB-18
BE-D-L-CCMS-VA	**Water**							
Batch R3967194								
WG2718612-2 LCS								
Beryllium (Be)-Dissolved			95.5		%		80-120	20-FEB-18
WG2718612-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	20-FEB-18
BR-L-IC-N-CL	**Water**							
Batch R3963828								
WG2718242-2 LCS								
Bromide (Br)			98.1		%		85-115	16-FEB-18
WG2718242-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	16-FEB-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R3966512								
WG2719166-9 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	18-FEB-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R3966512								
WG2719166-10 LCS								
Total Organic Carbon			92.5		%		80-120	18-FEB-18
WG2719166-9 MB								
Total Organic Carbon			<0.50		mg/L		0.5	18-FEB-18
CL-IC-N-CL	**Water**							

Quality Control Report

Workorder: L2057053 Report Date: 23-FEB-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-CL	**Water**							
Batch R3963828								
WG2718242-2 LCS								
Chloride (Cl)			100.5		%		90-110	16-FEB-18
WG2718242-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	16-FEB-18
COLOUR-TRUE-CL	**Water**							
Batch R3961936								
WG2717311-2 LCS								
Colour, True			104.3		%		85-115	15-FEB-18
WG2717311-1 MB								
Colour, True			<5.0		CU		5	15-FEB-18
EC-L-PCT-CL	**Water**							
Batch R3966912								
WG2719689-23 LCS								
Conductivity (@ 25C)			105.1		%		90-110	20-FEB-18
WG2719689-22 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	20-FEB-18
F-IC-N-CL	**Water**							
Batch R3963828								
WG2718242-2 LCS								
Fluoride (F)			101.3		%		90-110	16-FEB-18
WG2718242-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	16-FEB-18
HG-D-CVAA-VA	**Water**							
Batch R3964875								
WG2718539-2 LCS								
Mercury (Hg)-Dissolved			99.8		%		80-120	19-FEB-18
WG2718539-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	19-FEB-18
MET-D-CCMS-VA	**Water**							
Batch R3967194								
WG2718612-2 LCS								
Aluminum (Al)-Dissolved			96.1		%		80-120	20-FEB-18
Antimony (Sb)-Dissolved			97.7		%		80-120	20-FEB-18
Arsenic (As)-Dissolved			91.8		%		80-120	20-FEB-18
Barium (Ba)-Dissolved			98.5		%		80-120	20-FEB-18
Bismuth (Bi)-Dissolved			102.6		%		80-120	20-FEB-18
Boron (B)-Dissolved			116.8		%		80-120	20-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3967194								
WG2718612-2 LCS								
Cadmium (Cd)-Dissolved			97.0		%		80-120	20-FEB-18
Calcium (Ca)-Dissolved			100.0		%		80-120	20-FEB-18
Chromium (Cr)-Dissolved			96.9		%		80-120	20-FEB-18
Cobalt (Co)-Dissolved			95.8		%		80-120	20-FEB-18
Copper (Cu)-Dissolved			93.9		%		80-120	20-FEB-18
Iron (Fe)-Dissolved			119.5		%		80-120	20-FEB-18
Lead (Pb)-Dissolved			103.1		%		80-120	20-FEB-18
Lithium (Li)-Dissolved			98.5		%		80-120	20-FEB-18
Magnesium (Mg)-Dissolved			95.8		%		80-120	20-FEB-18
Manganese (Mn)-Dissolved			103.1		%		80-120	20-FEB-18
Molybdenum (Mo)-Dissolved			99.99		%		80-120	20-FEB-18
Nickel (Ni)-Dissolved			95.9		%		80-120	20-FEB-18
Potassium (K)-Dissolved			98.9		%		80-120	20-FEB-18
Selenium (Se)-Dissolved			97.2		%		80-120	20-FEB-18
Silicon (Si)-Dissolved			97.1		%		80-120	20-FEB-18
Silver (Ag)-Dissolved			102.1		%		80-120	20-FEB-18
Sodium (Na)-Dissolved			98.6		%		80-120	20-FEB-18
Strontium (Sr)-Dissolved			106.7		%		80-120	20-FEB-18
Thallium (Tl)-Dissolved			104.5		%		80-120	20-FEB-18
Tin (Sn)-Dissolved			93.5		%		80-120	20-FEB-18
Titanium (Ti)-Dissolved			79.6	MES	%		80-120	20-FEB-18
Uranium (U)-Dissolved			102.6		%		80-120	20-FEB-18
Vanadium (V)-Dissolved			96.9		%		80-120	20-FEB-18
Zinc (Zn)-Dissolved			86.0		%		80-120	20-FEB-18
WG2718612-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	20-FEB-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	20-FEB-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	20-FEB-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	20-FEB-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	20-FEB-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	20-FEB-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3967194								
WG2718612-1 MB		**NP**						
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	20-FEB-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	20-FEB-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	20-FEB-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	20-FEB-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	20-FEB-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	20-FEB-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	20-FEB-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	20-FEB-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	20-FEB-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	20-FEB-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	20-FEB-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	20-FEB-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	20-FEB-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	20-FEB-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	20-FEB-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	20-FEB-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	20-FEB-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	20-FEB-18
NH3-L-F-CL	**Water**							
Batch R3968473								
WG2721531-2 LCS								
Ammonia as N			103.8		%		85-115	23-FEB-18
WG2721531-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	23-FEB-18
NO2-L-IC-N-CL	**Water**							
Batch R3963828								
WG2718242-2 LCS								
Nitrite (as N)			103.5		%		90-110	16-FEB-18
WG2718242-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	16-FEB-18
NO3-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R3963828								
WG2718242-2 LCS								
Nitrate (as N)			100.5		%		90-110	16-FEB-18
WG2718242-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	16-FEB-18
ORP-CL	**Water**							
Batch R3968573								
WG2721619-1 CRM		**CL-ORP**						
ORP			219		mV		210-230	23-FEB-18
P-T-L-COL-ED	**Water**							
Batch R3968559								
WG2721114-18 LCS								
Phosphorus (P)-Total			102.4		%		80-120	23-FEB-18
WG2721114-2 LCS								
Phosphorus (P)-Total			103.6		%		80-120	23-FEB-18
WG2721114-20 LCS								
Phosphorus (P)-Total			102.0		%		80-120	23-FEB-18
WG2721114-22 LCS								
Phosphorus (P)-Total			101.8		%		80-120	23-FEB-18
WG2721114-24 LCS								
Phosphorus (P)-Total			101.0		%		80-120	23-FEB-18
WG2721114-26 LCS								
Phosphorus (P)-Total			100.4		%		80-120	23-FEB-18
WG2721114-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
WG2721114-17 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
WG2721114-19 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
WG2721114-21 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
WG2721114-23 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
WG2721114-25 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
PH-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-CL	**Water**							
Batch R3966912								
WG2719689-23 LCS								
pH			7.00		pH		6.9-7.1	20-FEB-18
PO4-DO-L-COL-ED	**Water**							
Batch R3962531								
WG2717579-6 LCS								
Orthophosphate-Dissolved (as P)			97.6		%		80-120	16-FEB-18
WG2717579-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	16-FEB-18
SO4-IC-N-CL	**Water**							
Batch R3963828								
WG2718242-2 LCS								
Sulfate (SO4)			101.4		%		90-110	16-FEB-18
WG2718242-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	16-FEB-18
SOLIDS-TDS-CL	**Water**							
Batch R3967879								
WG2719625-5 LCS								
Total Dissolved Solids			100.5		%		85-115	21-FEB-18
WG2719625-4 MB								
Total Dissolved Solids			<10		mg/L		10	21-FEB-18
TKN-L-F-CL	**Water**							
Batch R3967852								
WG2720546-3 DUP		**L2057053-1**						
Total Kjeldahl Nitrogen		0.088	0.090		mg/L	2.2	20	22-FEB-18
WG2720546-2 LCS								
Total Kjeldahl Nitrogen			108.4		%		75-125	22-FEB-18
WG2720546-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	22-FEB-18
WG2720546-4 MS		**L2057053-1**						
Total Kjeldahl Nitrogen			91.7		%		70-130	22-FEB-18
TSS-L-CL	**Water**							
Batch R3967126								
WG2719409-5 LCS								
Total Suspended Solids			88.4		%		85-115	20-FEB-18
WG2719409-8 LCS								
Total Suspended Solids			93.3		%		85-115	20-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-L-CL	**Water**							
Batch R3967126								
WG2719409-4 MB								
Total Suspended Solids			<1.0		mg/L		1	20-FEB-18
WG2719409-7 MB								
Total Suspended Solids			<1.0		mg/L		1	20-FEB-18
TURBIDITY-CL	**Water**							
Batch R3966268								
WG2717766-2 LCS								
Turbidity			97.5		%		85-115	16-FEB-18
WG2717766-1 MB								
Turbidity			<0.10		NTU		0.1	16-FEB-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	14-FEB-18 12:30	20-FEB-18 10:00	0.25	142	hours	EHTR-FM
	2	14-FEB-18 12:20	20-FEB-18 10:00	0.25	142	hours	EHTR-FM
	3	14-FEB-18 13:50	20-FEB-18 10:00	0.25	140	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2057053 were received on 15-FEB-18 09:15.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	20180214Q1GW	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q1 Ground Water Sampling			Lab Contact	Lyudmyla Shvets			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cameron Griffin			Email	Lyudmyla.Shvets@alsglobal.com			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.Griffin@Teck.com			Address	2559 29 St NE			Email 3:	James.Bokh@teck.com	X	X	X
Address	RR#1 HWY# 3							Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Reports@sharepoint.teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO #	538700			
Postal Code	V1C 4C3	Country	Canada	Postal Code	T1Y 7B5	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	1 403 291 9897							

SAMPLE DETAILS								ANALYSIS REQUESTED														
								FILTERED	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	Yes
								PRESERVED			Nitric	Sulphuric	Sulphuric						Sodium Bisulphate	Sodium Bisulphate	HCl	HCl
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ASSESS	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	TKN/TOC (APHA 4500-NORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	T-METHYL MERCURY	PAH, EPH (C10-C32)	EPH (C10-C32)	T-Mercury	D-Mercury		
EV_WH50gw_WG_2018-02_NP	EV_WH50gw	WG	N	2/14/2018	12:30	G	5		1		1	1	1							1		
EV_RCSgw_WG_2018-02_NP	EV_RCSgw	WG	N	2/14/2018	12:20	G	5		1		1	1	1							1		
EV_BRgw_WG_2018-02_NP	EV_BRgw	WG	N	2/14/2018	13:50	G	5		1		1	1	1							1		
					Total		15															

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Ultra-trace Mercury samples are unfiltered and unpreserved	Bryan Ogden	February 14, 2018		
Total Methyl Mercury samples are preserved but unfiltered				
Total Selenium samples are preserved but unfiltered				
Dissolved Selenium samples are preserved and filtered				

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Bryan Ogden	Mobile #	250 425 3629
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	February 14, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

L2057053-COFC

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 16-FEB-18
Report Date: 04-FEB-19 17:20 (MT)
Version: FINAL REV. 2

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2057755

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180215Q1GW
Legal Site Desc:

Comments: 4-FEB-2019 Total Nitrogen result added on L2057755-1 to -5.

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2057755-1	L2057755-2	L2057755-3	L2057755-4	L2057755-5
Description	WG	WG	WG	WG	WG
Sampled Date	15-FEB-18	15-FEB-18	15-FEB-18	15-FEB-18	15-FEB-18
Sampled Time	14:45	14:50	14:55	14:40	13:10
Client ID	EV_EC5GW_WG_2018-02_NP	EV_EC6GW_WG_2018-02_NP	EV_EC7GW_WG_2018-02_NP	EV_BCGW_WG_2018-02_NP	EV_LSGW_WG_2018-02_NP
Grouping / **Analyte**					
WATER					
Physical Tests					
Colour, True (CU)	<5.0	<5.0	<5.0	5.2	<5.0
Conductivity (@ 25C) (uS/cm)	1040	<2.0	<2.0	1040	973
Hardness (as CaCO3) (mg/L)	572	<0.50	<0.50	582	547
pH (pH)	7.81	5.45	5.42	7.81	8.01
ORP (mV)	333	524	508	327	250
Total Suspended Solids (mg/L)	1.4	<1.0	<1.0	1.8	9.8
Total Dissolved Solids (mg/L)	771 DLHC	<10	<10	788 DLHC	565 DLHC
Turbidity (NTU)	0.67	0.18	<0.10	1.10	17.4
Anions and Nutrients					
Acidity (as CaCO3) (mg/L)	5.9	<1.0	1.3	8.0	12.2
Alkalinity, Bicarbonate (as CaCO3) (mg/L)	270	<1.0	1.0	271	508
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	270	<1.0	1.0	271	508
Ammonia as N (mg/L)	0.0054	<0.0050	0.0252 RRV	<0.0050	0.169
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	9.38	<0.50	<0.50	9.46	9.09
Fluoride (F) (mg/L)	0.106	<0.020	<0.020	0.102	0.197
Ion Balance (%)	91.7	0.0	22.3 RRV	93.3	95.6
Nitrate (as N) (mg/L)	8.23	<0.0050	<0.0050	8.25	0.0060
Nitrite (as N) (mg/L)	0.0059	<0.0010	<0.0010	0.0131	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.088 TKNI	<0.050	<0.050	<0.050 TKNI	0.159
Total Nitrogen (mg/L)	8.32	<0.050	<0.050	8.27	0.165
Orthophosphate-Dissolved (as P) (mg/L)	0.0035	<0.0010	<0.0010	0.0035	<0.0010
Phosphorus (P)-Total (mg/L)	0.0035	<0.0010	<0.0010	0.0035	0.0379
Sulfate (SO4) (mg/L)	311	<0.30	<0.30	311	77.1
Anion Sum (meq/L)	12.7	<0.10	<0.10	12.8	12.0
Cation Sum (meq/L)	11.7	<0.10	<0.10	11.9	11.5
Cation - Anion Balance (%)	-4.3	0.0	-63.5	-3.5	-2.2
Organic / Inorganic Carbon					
Dissolved Organic Carbon (mg/L)	<0.50	<0.50		0.74	2.90
Total Organic Carbon (mg/L)	<0.50	<0.50	<0.50	0.77	3.05
Dissolved Metals					
Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)-Dissolved (mg/L)	0.00011	<0.00010	<0.00010	0.00011	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00012	<0.00010	<0.00010	0.00012	0.00125
Barium (Ba)-Dissolved (mg/L)	0.0446	<0.00010 RRV	<0.00010	0.0465	0.154

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2057755-1	L2057755-2	L2057755-3	L2057755-4	L2057755-5
	Description	WG	WG	WG	WG	WG
	Sampled Date	15-FEB-18	15-FEB-18	15-FEB-18	15-FEB-18	15-FEB-18
	Sampled Time	14:45	14:50	14:55	14:40	13:10
	Client ID	EV_EC5GW_WG_2018-02_NP	EV_EC6GW_WG_2018-02_NP	EV_EC7GW_WG_2018-02_NP	EV_BCGW_WG_2018-02_NP	EV_LSGW_WG_2018-02_NP
Grouping	**Analyte**					
WATER						
Dissolved Metals	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	0.017	<0.010	<0.010	0.017	0.031
	Cadmium (Cd)-Dissolved (ug/L)	0.0446	<0.0050	<0.0050	0.0521	<0.0050
	Calcium (Ca)-Dissolved (mg/L)	139	<0.050	<0.050	142	103
	Chromium (Cr)-Dissolved (mg/L)	0.00015	<0.00010	<0.00010	0.00014	<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	0.92
	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	0.012 RRV	0.011	1.45
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0357	<0.0010	<0.0010	0.0366	0.0524
	Magnesium (Mg)-Dissolved (mg/L)	54.7	<0.10	<0.10	55.0	70.2
	Manganese (Mn)-Dissolved (mg/L)	<0.00010	<0.00010	0.00011 RRV	<0.00010	1.08
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000708	<0.000050	<0.000050	0.000727	0.00259
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	0.00379
	Potassium (K)-Dissolved (mg/L)	1.32	<0.050	<0.050	1.33	2.93
	Selenium (Se)-Dissolved (ug/L)	45.7	<0.050	<0.050	46.9	0.116
	Silicon (Si)-Dissolved (mg/L)	2.93	<0.050	<0.050	2.88	3.57
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	5.40	<0.050	<0.050	5.51	8.54
	Strontium (Sr)-Dissolved (mg/L)	0.240	<0.00020	<0.00020	0.243	0.413
	Thallium (Tl)-Dissolved (mg/L)	0.000015	<0.000010	<0.000010	0.000017	0.000038
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00169	<0.000010	<0.000010	0.00172	0.00211
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Hydrocarbons	EPH10-19 (mg/L)			<0.25		
	EPH (C10-C32) (mg/L)			<0.50		
	EPH19-32 (mg/L)			<0.25		
	TEH (C10-C30) (mg/L)			<0.25		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Barium (Ba)-Dissolved	MB-LOR	L2057755-1, -3, -4, -5
Matrix Spike	Ammonia as N	MS-B	L2057755-1, -2, -3, -4, -5

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

EPH(10-32)-CALC-CL	Water	Sum of EPH (10-32)	Sum of EPH - Auto Calculated

Reference Information

The sum of EPH(C10-C19) and EPH(C19-C32)

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

Reference Information

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TEH-BC-VA-CL Water EPH (C10-C19) & EPH (C19-C32) BCMOE EPH GCFID

Analysis is in accordance with BC MOE Lab Manual method "Extractable Petroleum Hydrocarbons in Water by GC/FID", v2.1, July 1999. Whole water samples are extracted with DCM prior to gas chromatography with flame ionization detection (GC-FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

TEH-WATER-VA-CL Water TEH (C10-C30) EPA 3510/8000-GC-FID

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180215Q1GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R3967079								
WG2719909-2 LCS								
Acidity (as CaCO3)			108.7		%		85-115	21-FEB-18
WG2719909-1 MB								
Acidity (as CaCO3)			1.6		mg/L		2	21-FEB-18
ALK-MAN-CL	**Water**							
Batch R3964385								
WG2718423-17 LCS								
Alkalinity, Total (as CaCO3)			105.1		%		85-115	17-FEB-18
WG2718423-16 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	17-FEB-18
BE-D-L-CCMS-VA	**Water**							
Batch R3967889								
WG2720123-3 DUP		**L2057755-4**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	21-FEB-18
WG2720123-2 LCS								
Beryllium (Be)-Dissolved			96.9		%		80-120	21-FEB-18
WG2720123-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	21-FEB-18
WG2720123-4 MS		**L2057755-2**						
Beryllium (Be)-Dissolved			100.5		%		70-130	21-FEB-18
BR-L-IC-N-CL	**Water**							
Batch R3966438								
WG2719165-7 DUP		**L2057755-5**						
Bromide (Br)		<0.050	0.066	RPD-NA	mg/L	N/A	20	17-FEB-18
WG2719165-6 LCS								
Bromide (Br)			100.0		%		85-115	17-FEB-18
WG2719165-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	17-FEB-18
WG2719165-8 MS		**L2057755-5**						
Bromide (Br)			110.4		%		75-125	17-FEB-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R3969248								
WG2722254-2 LCS								
Dissolved Organic Carbon			100.8		%		80-120	23-FEB-18
WG2722254-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	24-FEB-18
C-TOT-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R3969248								
WG2722254-3 DUP		**L2057755-3**						
Total Organic Carbon		<0.50	<0.50	RPD-NA	mg/L	N/A	20	23-FEB-18
WG2722254-2 LCS								
Total Organic Carbon			103.0		%		80-120	23-FEB-18
WG2722254-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	24-FEB-18
WG2722254-4 MS		**L2057755-3**						
Total Organic Carbon			81.0		%		70-130	23-FEB-18
CL-IC-N-CL	**Water**							
Batch R3966438								
WG2719165-7 DUP		**L2057755-5**						
Chloride (Cl)		9.09	9.07		mg/L	0.3	20	17-FEB-18
WG2719165-6 LCS								
Chloride (Cl)			98.8		%		90-110	17-FEB-18
WG2719165-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	17-FEB-18
WG2719165-8 MS		**L2057755-5**						
Chloride (Cl)			100.4		%		75-125	17-FEB-18
COLOUR-TRUE-CL	**Water**							
Batch R3962888								
WG2717931-4 DUP		**L2057755-5**						
Colour, True		<5.0	<5.0	RPD-NA	CU	N/A	20	16-FEB-18
WG2717931-2 LCS								
Colour, True			103.3		%		85-115	16-FEB-18
WG2717931-1 MB								
Colour, True			<5.0		CU		5	16-FEB-18
EC-L-PCT-CL	**Water**							
Batch R3964385								
WG2718423-17 LCS								
Conductivity (@ 25C)			106.5		%		90-110	17-FEB-18
WG2718423-16 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	17-FEB-18
F-IC-N-CL	**Water**							
Batch R3966438								
WG2719165-7 DUP		**L2057755-5**						
Fluoride (F)		0.197	0.222		mg/L	12	20	17-FEB-18
WG2719165-6 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-CL	**Water**							
Batch R3966438								
WG2719165-6 LCS								
Fluoride (F)			97.2		%		90-110	17-FEB-18
WG2719165-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	17-FEB-18
WG2719165-8 MS		**L2057755-5**						
Fluoride (F)			99.8		%		75-125	17-FEB-18
HG-D-CVAA-VA	**Water**							
Batch R3967708								
WG2720597-2 LCS								
Mercury (Hg)-Dissolved			98.4		%		80-120	22-FEB-18
WG2720597-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005[illegible]		mg/L		0.000005	22-FEB-18
WG2720597-4 MS		**L2057755-1**						
Mercury (Hg)-Dissolved			101.4		%		70-130	22-FEB-18
MET-D-CCMS-VA	**Water**							
Batch R3967889								
WG2720123-3 DUP		**L2057755-4**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	21-FEB-18
Antimony (Sb)-Dissolved		0.00011	0.00011		mg/L	0.8	20	21-FEB-18
Arsenic (As)-Dissolved		0.00012	0.00012		mg/L	2.3	20	21-FEB-18
Barium (Ba)-Dissolved		0.0465	0.0449		mg/L	3.4	20	21-FEB-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	21-FEB-18
Boron (B)-Dissolved		0.017	0.017		mg/L	3.6	20	21-FEB-18
Cadmium (Cd)-Dissolved		0.0000521	0.0000514		mg/L	1.2	20	21-FEB-18
Calcium (Ca)-Dissolved		142	141		mg/L	0.8	20	21-FEB-18
Chromium (Cr)-Dissolved		0.00014	<0.00010	RPD-NA	mg/L	N/A	20	21-FEB-18
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	21-FEB-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	21-FEB-18
Iron (Fe)-Dissolved		0.011	0.010		mg/L	2.3	20	21-FEB-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	21-FEB-18
Lithium (Li)-Dissolved		0.0366	0.0344		mg/L	6.1	20	21-FEB-18
Magnesium (Mg)-Dissolved		55.0	54.0		mg/L	1.8	20	21-FEB-18
Manganese (Mn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	21-FEB-18
Molybdenum (Mo)-Dissolved		0.000727	0.000709		mg/L	2.6	20	21-FEB-18
Nickel (Ni)-Dissolved		<0.00050	0.00050	RPD-NA	mg/L	N/A	20	21-FEB-18
Potassium (K)-Dissolved		1.33	1.31		mg/L	2.1	20	21-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3967889								
WG2720123-3 DUP		**L2057755-4**						
Selenium (Se)-Dissolved		0.0469	0.0454		mg/L	3.2	20	21-FEB-18
Silicon (Si)-Dissolved		2.88	2.80		mg/L	2.7	20	21-FEB-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	21-FEB-18
Sodium (Na)-Dissolved		5.51	5.25		mg/L	4.9	20	21-FEB-18
Strontium (Sr)-Dissolved		0.243	0.229		mg/L	5.6	20	21-FEB-18
Thallium (Tl)-Dissolved		0.000017	0.000016		mg/L	7.6	20	21-FEB-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	21-FEB-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	21-FEB-18
Uranium (U)-Dissolved		0.00172	0.00169		mg/L	1.7	20	21-FEB-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	21-FEB-18
Zinc (Zn)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	21-FEB-18
WG2720123-2 LCS								
Aluminum (Al)-Dissolved			94.8		%		80-120	21-FEB-18
Antimony (Sb)-Dissolved			89.8		%		80-120	21-FEB-18
Arsenic (As)-Dissolved			88.7		%		80-120	21-FEB-18
Barium (Ba)-Dissolved			91.3		%		80-120	21-FEB-18
Bismuth (Bi)-Dissolved			101.4		%		80-120	21-FEB-18
Boron (B)-Dissolved			86.8		%		80-120	21-FEB-18
Cadmium (Cd)-Dissolved			93.8		%		80-120	21-FEB-18
Calcium (Ca)-Dissolved			99.7		%		80-120	21-FEB-18
Chromium (Cr)-Dissolved			90.8		%		80-120	21-FEB-18
Cobalt (Co)-Dissolved			91.2		%		80-120	21-FEB-18
Copper (Cu)-Dissolved			93.8		%		80-120	21-FEB-18
Iron (Fe)-Dissolved			91.3		%		80-120	21-FEB-18
Lead (Pb)-Dissolved			102.1		%		80-120	21-FEB-18
Lithium (Li)-Dissolved			92.5		%		80-120	21-FEB-18
Magnesium (Mg)-Dissolved			95.9		%		80-120	21-FEB-18
Manganese (Mn)-Dissolved			91.8		%		80-120	21-FEB-18
Molybdenum (Mo)-Dissolved			89.4		%		80-120	21-FEB-18
Nickel (Ni)-Dissolved			95.5		%		80-120	21-FEB-18
Potassium (K)-Dissolved			91.4		%		80-120	21-FEB-18
Selenium (Se)-Dissolved			95.7		%		80-120	21-FEB-18
Silicon (Si)-Dissolved			91.9		%		80-120	21-FEB-18
Silver (Ag)-Dissolved			91.0		%		80-120	21-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3967889								
WG2720123-2 LCS								
Sodium (Na)-Dissolved			89.7		%		80-120	21-FEB-18
Strontium (Sr)-Dissolved			89.5		%		80-120	21-FEB-18
Thallium (Tl)-Dissolved			101.4		%		80-120	21-FEB-18
Tin (Sn)-Dissolved			91.8		%		80-120	21-FEB-18
Titanium (Ti)-Dissolved			95.6		%		80-120	21-FEB-18
Uranium (U)-Dissolved			101.7		%		80-120	21-FEB-18
Vanadium (V)-Dissolved			91.8		%		80-120	21-FEB-18
Zinc (Zn)-Dissolved			87.1		%		80-120	21-FEB-18
WG2720123-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	21-FEB-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	21-FEB-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	21-FEB-18
Barium (Ba)-Dissolved			0.000142	MB-LOR	mg/L		0.00005	21-FEB-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	21-FEB-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	21-FEB-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	21-FEB-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	21-FEB-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	21-FEB-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	21-FEB-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	21-FEB-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	21-FEB-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	21-FEB-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	21-FEB-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	21-FEB-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	21-FEB-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	21-FEB-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	21-FEB-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	21-FEB-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	21-FEB-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	21-FEB-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	21-FEB-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	21-FEB-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	21-FEB-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	21-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3967889								
WG2720123-1 MB		**NP**						
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	21-FEB-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	21-FEB-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	21-FEB-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	21-FEB-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	21-FEB-18
WG2720123-4 MS		**L2057755-2**						
Aluminum (Al)-Dissolved			95.0		%		70-130	21-FEB-18
Antimony (Sb)-Dissolved			93.7		%		70-130	21-FEB-18
Arsenic (As)-Dissolved			94.5		%		70-130	21-FEB-18
Bismuth (Bi)-Dissolved			85.7		%		70-130	21-FEB-18
Boron (B)-Dissolved			91.4		%		70-130	21-FEB-18
Cadmium (Cd)-Dissolved			98.2		%		70-130	21-FEB-18
Chromium (Cr)-Dissolved			93.1		%		70-130	21-FEB-18
Cobalt (Co)-Dissolved			95.5		%		70-130	21-FEB-18
Copper (Cu)-Dissolved			97.1		%		70-130	21-FEB-18
Iron (Fe)-Dissolved			93.1		%		70-130	21-FEB-18
Lead (Pb)-Dissolved			97.9		%		70-130	21-FEB-18
Lithium (Li)-Dissolved			102.3		%		70-130	21-FEB-18
Magnesium (Mg)-Dissolved			93.9		%		70-130	21-FEB-18
Manganese (Mn)-Dissolved			92.1		%		70-130	21-FEB-18
Molybdenum (Mo)-Dissolved			85.1		%		70-130	21-FEB-18
Nickel (Ni)-Dissolved			98.3		%		70-130	21-FEB-18
Potassium (K)-Dissolved			96.1		%		70-130	21-FEB-18
Selenium (Se)-Dissolved			102.8		%		70-130	21-FEB-18
Silicon (Si)-Dissolved			90.0		%		70-130	21-FEB-18
Silver (Ag)-Dissolved			92.5		%		70-130	21-FEB-18
Sodium (Na)-Dissolved			94.0		%		70-130	21-FEB-18
Strontium (Sr)-Dissolved			87.0		%		70-130	21-FEB-18
Thallium (Tl)-Dissolved			98.0		%		70-130	21-FEB-18
Tin (Sn)-Dissolved			92.9		%		70-130	21-FEB-18
Titanium (Ti)-Dissolved			90.4		%		70-130	21-FEB-18
Uranium (U)-Dissolved			96.4		%		70-130	21-FEB-18
Vanadium (V)-Dissolved			91.1		%		70-130	21-FEB-18
Zinc (Zn)-Dissolved			96.7		%		70-130	21-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3969005								
WG2720921-3 DUP		**L2057755-3**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	23-FEB-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-FEB-18
Arsenic (As)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-FEB-18
Barium (Ba)-Dissolved		<0.00010	<0.000050	RPD-NA	mg/L	N/A	20	23-FEB-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-FEB-18
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-FEB-18
Cadmium (Cd)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	23-FEB-18
Calcium (Ca)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	23-FEB-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-FEB-18
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-FEB-18
Copper (Cu)-Dissolved		<0.00050	0.00065	RPD-NA	mg/L	N/A	20	23-FEB-18
Iron (Fe)-Dissolved		0.012	0.012		mg/L	1.1	20	23-FEB-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-FEB-18
Lithium (Li)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-FEB-18
Magnesium (Mg)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	23-FEB-18
Manganese (Mn)-Dissolved		0.00011	0.00014	J	mg/L	0.00003	0.0002	23-FEB-18
Molybdenum (Mo)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-FEB-18
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-FEB-18
Potassium (K)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	23-FEB-18
Selenium (Se)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-FEB-18
Silicon (Si)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	23-FEB-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	23-FEB-18
Sodium (Na)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	23-FEB-18
Strontium (Sr)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	23-FEB-18
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	23-FEB-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-FEB-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-FEB-18
Uranium (U)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	23-FEB-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-FEB-18
Zinc (Zn)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	23-FEB-18
WG2720921-2 LCS								
Aluminum (Al)-Dissolved			98.5		%		80-120	23-FEB-18
Antimony (Sb)-Dissolved			97.4		%		80-120	23-FEB-18
Arsenic (As)-Dissolved			96.8		%		80-120	23-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3969005								
WG2720921-2 LCS								
Barium (Ba)-Dissolved			102.2		%		80-120	23-FEB-18
Bismuth (Bi)-Dissolved			94.0		%		80-120	23-FEB-18
Boron (B)-Dissolved			85.7		%		80-120	23-FEB-18
Cadmium (Cd)-Dissolved			111.5		%		80-120	23-FEB-18
Calcium (Ca)-Dissolved			94.2		%		80-120	23-FEB-18
Chromium (Cr)-Dissolved			97.0		%		80-120	23-FEB-18
Cobalt (Co)-Dissolved			97.7		%		80-120	23-FEB-18
Copper (Cu)-Dissolved			96.8		%		80-120	23-FEB-18
Iron (Fe)-Dissolved			99.5		%		80-120	23-FEB-18
Lead (Pb)-Dissolved			96.6		%		80-120	23-FEB-18
Lithium (Li)-Dissolved			96.0		%		80-120	23-FEB-18
Magnesium (Mg)-Dissolved			88.9		%		80-120	23-FEB-18
Manganese (Mn)-Dissolved			100.7		%		80-120	23-FEB-18
Molybdenum (Mo)-Dissolved			100.1		%		80-120	23-FEB-18
Nickel (Ni)-Dissolved			98.0		%		80-120	23-FEB-18
Potassium (K)-Dissolved			100.4		%		80-120	23-FEB-18
Selenium (Se)-Dissolved			98.5		%		80-120	23-FEB-18
Silicon (Si)-Dissolved			98.0		%		80-120	23-FEB-18
Silver (Ag)-Dissolved			95.9		%		80-120	23-FEB-18
Sodium (Na)-Dissolved			109.3		%		80-120	23-FEB-18
Strontium (Sr)-Dissolved			103.0		%		80-120	23-FEB-18
Thallium (Tl)-Dissolved			96.4		%		80-120	23-FEB-18
Tin (Sn)-Dissolved			98.3		%		80-120	23-FEB-18
Titanium (Ti)-Dissolved			93.6		%		80-120	23-FEB-18
Uranium (U)-Dissolved			104.1		%		80-120	23-FEB-18
Vanadium (V)-Dissolved			97.9		%		80-120	23-FEB-18
Zinc (Zn)-Dissolved			93.9		%		80-120	23-FEB-18
WG2720921-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	23-FEB-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	23-FEB-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	23-FEB-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	23-FEB-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	23-FEB-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	23-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3969005								
WG2720921-1 MB		**NP**						
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	23-FEB-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-FEB-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	23-FEB-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	23-FEB-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	23-FEB-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	23-FEB-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	23-FEB-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	23-FEB-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-FEB-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	23-FEB-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	23-FEB-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	23-FEB-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-FEB-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	23-FEB-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	23-FEB-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	23-FEB-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-FEB-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	23-FEB-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	23-FEB-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	23-FEB-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	23-FEB-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	23-FEB-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	23-FEB-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	23-FEB-18
WG2720921-4 MS		**L2057755-2**						
Aluminum (Al)-Dissolved			99.0		%		70-130	23-FEB-18
Antimony (Sb)-Dissolved			105.1		%		70-130	23-FEB-18
Arsenic (As)-Dissolved			96.2		%		70-130	23-FEB-18
Barium (Ba)-Dissolved			101.9		%		70-130	23-FEB-18
Bismuth (Bi)-Dissolved			81.4		%		70-130	23-FEB-18
Boron (B)-Dissolved			86.2		%		70-130	23-FEB-18
Cadmium (Cd)-Dissolved			109.0		%		70-130	23-FEB-18
Calcium (Ca)-Dissolved			94.1		%		70-130	23-FEB-18
Chromium (Cr)-Dissolved			97.7		%		70-130	23-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3969005								
WG2720921-4 MS		**L2057755-2**						
Cobalt (Co)-Dissolved			100.1		%		70-130	23-FEB-18
Copper (Cu)-Dissolved			99.3		%		70-130	23-FEB-18
Iron (Fe)-Dissolved			97.0		%		70-130	23-FEB-18
Lead (Pb)-Dissolved			96.4		%		70-130	23-FEB-18
Lithium (Li)-Dissolved			102.9		%		70-130	23-FEB-18
Magnesium (Mg)-Dissolved			97.9		%		70-130	23-FEB-18
Manganese (Mn)-Dissolved			100.5		%		70-130	23-FEB-18
Molybdenum (Mo)-Dissolved			97.7		%		70-130	23-FEB-18
Nickel (Ni)-Dissolved			100.9		%		70-130	23-FEB-18
Potassium (K)-Dissolved			101.6		%		70-130	23-FEB-18
Selenium (Se)-Dissolved			98.7		%		70-130	23-FEB-18
Silicon (Si)-Dissolved			92.0		%		70-130	23-FEB-18
Silver (Ag)-Dissolved			102.4		%		70-130	23-FEB-18
Sodium (Na)-Dissolved			104.3		%		70-130	23-FEB-18
Strontium (Sr)-Dissolved			115.1		%		70-130	23-FEB-18
Thallium (Tl)-Dissolved			95.2		%		70-130	23-FEB-18
Tin (Sn)-Dissolved			99.8		%		70-130	23-FEB-18
Titanium (Ti)-Dissolved			95.1		%		70-130	23-FEB-18
Uranium (U)-Dissolved			100.0		%		70-130	23-FEB-18
Vanadium (V)-Dissolved			96.9		%		70-130	23-FEB-18
Zinc (Zn)-Dissolved			100.4		%		70-130	23-FEB-18
NH3-L-F-CL	**Water**							
Batch R3968473								
WG2721531-11 DUP		**L2057755-5**						
Ammonia as N		0.169	0.171		mg/L	1.1	20	23-FEB-18
WG2721531-10 LCS								
Ammonia as N			101.5		%		85-115	23-FEB-18
WG2721531-2 LCS								
Ammonia as N			103.8		%		85-115	23-FEB-18
WG2721531-6 LCS								
Ammonia as N			102.4		%		85-115	23-FEB-18
WG2721531-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	23-FEB-18
WG2721531-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	23-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-L-F-CL	**Water**							
Batch R3968473								
WG2721531-9 MB								
Ammonia as N			<0.0050		mg/L		0.005	23-FEB-18
WG2721531-12 MS		**L2057755-5**						
Ammonia as N			N/A	MS-B	%		-	23-FEB-18
NO2-L-IC-N-CL	**Water**							
Batch R3966438								
WG2719165-7 DUP		**L2057755-5**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	17-FEB-18
WG2719165-6 LCS								
Nitrite (as N)			104.9		%		90-110	17-FEB-18
WG2719165-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	17-FEB-18
WG2719165-8 MS		**L2057755-5**						
Nitrite (as N)			101.8		%		75-125	17-FEB-18
NO3-L-IC-N-CL	**Water**							
Batch R3966438								
WG2719165-7 DUP		**L2057755-5**						
Nitrate (as N)		0.0060	<0.0050	RPD-NA	mg/L	N/A	20	17-FEB-18
WG2719165-6 LCS								
Nitrate (as N)			99.3		%		90-110	17-FEB-18
WG2719165-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	17-FEB-18
WG2719165-8 MS		**L2057755-5**						
Nitrate (as N)			99.9		%		75-125	17-FEB-18
ORP-CL	**Water**							
Batch R3968573								
WG2721619-3 CRM		**CL-ORP**						
ORP			212		mV		210-230	23-FEB-18
WG2721619-5 CRM		**CL-ORP**						
ORP			212		mV		210-230	23-FEB-18
P-T-L-COL-ED	**Water**							
Batch R3968559								
WG2721114-18 LCS								
Phosphorus (P)-Total			102.4		%		80-120	23-FEB-18
WG2721114-2 LCS								
Phosphorus (P)-Total			103.6		%		80-120	23-FEB-18
WG2721114-20 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-ED	**Water**							
Batch R3968559								
WG2721114-20 LCS								
Phosphorus (P)-Total			102.0		%		80-120	23-FEB-18
WG2721114-22 LCS								
Phosphorus (P)-Total			101.8		%		80-120	23-FEB-18
WG2721114-24 LCS								
Phosphorus (P)-Total			101.0		%		80-120	23-FEB-18
WG2721114-26 LCS								
Phosphorus (P)-Total			100.4		%		80-120	23-FEB-18
WG2721114-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
WG2721114-17 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
WG2721114-19 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
WG2721114-21 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
WG2721114-23 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
WG2721114-25 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-FEB-18
PH-CL	**Water**							
Batch R3964385								
WG2718423-17 LCS								
pH			7.05		pH		6.9-7.1	17-FEB-18
PO4-DO-L-COL-ED	**Water**							
Batch R3964030								
WG2718219-10 LCS								
Orthophosphate-Dissolved (as P)			94.8		%		80-120	17-FEB-18
WG2718219-2 LCS								
Orthophosphate-Dissolved (as P)			95.6		%		80-120	17-FEB-18
WG2718219-6 LCS								
Orthophosphate-Dissolved (as P)			91.8		%		80-120	17-FEB-18
WG2718219-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-FEB-18
WG2718219-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-FEB-18
WG2718219-9 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-L-COL-ED	**Water**							
Batch R3964030								
WG2718219-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-FEB-18
SO4-IC-N-CL	**Water**							
Batch R3966438								
WG2719165-7 DUP		**L2057755-5**						
Sulfate (SO4)		77.1	77.1		mg/L	0.1	20	17-FEB-18
WG2719165-6 LCS								
Sulfate (SO4)			100.5		%		90-110	17-FEB-18
WG2719165-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	17-FEB-18
WG2719165-8 MS		**L2057755-5**						
Sulfate (SO4)			98.6		%		75-125	17-FEB-18
SOLIDS-TDS-CL	**Water**							
Batch R3968476								
WG2720430-2 LCS								
Total Dissolved Solids			99.97		%		85-115	22-FEB-18
WG2720430-1 MB								
Total Dissolved Solids			<10		mg/L		10	22-FEB-18
TEH-BC-VA-CL	**Water**							
Batch R3967062								
WG2719854-2 LCS								
EPH10-19			105.0		%		50-150	20-FEB-18
EPH19-32			108.8		%		50-150	20-FEB-18
WG2719854-1 MB								
EPH10-19			<0.25		mg/L		0.25	20-FEB-18
EPH19-32			<0.25		mg/L		0.25	20-FEB-18
TEH-WATER-VA-CL	**Water**							
Batch R3967062								
WG2719854-2 LCS								
TEH (C10-C30)			105.5		%		50-150	20-FEB-18
WG2719854-1 MB								
TEH (C10-C30)			<0.25		mg/L		0.25	20-FEB-18
TKN-L-F-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-L-F-CL	**Water**							
Batch R3967852								
WG2720546-10 LCS								
Total Kjeldahl Nitrogen			104.5		%		75-125	22-FEB-18
WG2720546-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	22-FEB-18
TSS-L-CL	**Water**							
Batch R3968477								
WG2720910-2 LCS								
Total Suspended Solids			91.1		%		85-115	22-FEB-18
WG2720910-1 MB								
Total Suspended Solids			<1.0		mg/L		1	22-FEB-18
TURBIDITY-CL	**Water**							
Batch R3964227								
WG2718358-2 LCS								
Turbidity			98.0		%		85-115	17-FEB-18
WG2718358-1 MB								
Turbidity			<0.10		NTU		0.1	17-FEB-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	15-FEB-18 14:45	17-FEB-18 11:00	0.25	44	hours	EHTR-FM
	2	15-FEB-18 14:50	17-FEB-18 11:00	0.25	44	hours	EHTR-FM
	3	15-FEB-18 14:55	17-FEB-18 11:00	0.25	44	hours	EHTR-FM
	4	15-FEB-18 14:40	17-FEB-18 11:00	0.25	44	hours	EHTR-FM
	5	15-FEB-18 13:10	17-FEB-18 11:00	0.25	46	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2057755 were received on 16-FEB-18 09:05.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

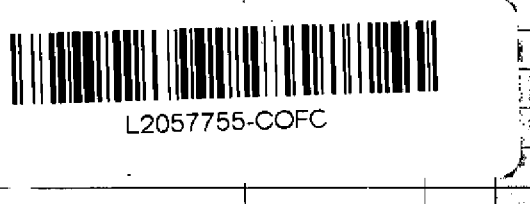
Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	20180215Q1GW	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q1 Ground Water Sampling			Lab Contact	Lyudmyla Shvets			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cameron Griffin			Email	Lyundyla.Shvets@alsglobal.com			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.Griffin@Teck.com			Address	2559 29 St NE.			Email 3:	James.Boldt@teck.com	X	X	X
Address	RR#1 HWY# 3							Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO #	538700			
Postal Code	V1C 4C3	Country	Canada	Postal Code	T1Y 7B5	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	1 403 291 9897							

SAMPLE DETAILS								ANALYSIS REQUESTED												
								FILTERED	No	No	Yes	Yes	No	No	No	No	No	No	No	No	Yes
								PRESERVED			Nitric	Sulphuric	Sulphuric			HCl	Sodium Bisulphate	Sodium Bisulphate	HCl	HCl
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	TKN/TOC (APHA 4500-NORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	T-METHYL MERCURY	PAH, EPH (C10-C32)	EPH (C10-C32)	T-Mercury	D-Mercury
EV_EC5gw_WG_2018-02_NP	EV_EC5gw	WG	N	2/15/2018	1445	G	5		1		1	1	1							1
EV_EC6gw_WG_2018-02_NP	EV_EC6gw	WG	N	2/15/2018	1450	G	5		1		1	1	1							1
EV_EC7gw_WG_2018-02_NP	EV_EC7gw	WG	N	2/15/2018	1455	G	5		1		1		1					1		1
EV_BCgw_WG_2018-02_NP	EV_BCgw	WG	N	2/15/2018	1410	G	5		1		1	1	1							1
EV_LSgw_WG_2018-02_NP	EV_LSgw	WG	N	2/15/2018	1310	G	5		1		1	1	1							1
					Total		25													



ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Ultra-trace Mercury samples are unfiltered and unpreserved	Bryan Ogden	February 15, 2018		
Total Methyl Mercucy samples are preserved but unfiltered				
Total Selenium samples are preserved but unfiltered				21/2 9:05
Dissolved Selenium samples are preserved and filtered				

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default) X	Sampler's Name	Bryan Ogden	Mobile #	250 425 3629	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	February 15, 2018	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 22-FEB-18
Report Date: 04-FEB-19 17:34 (MT)
Version: FINAL REV. 2

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2059920

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180221Q1GW
Legal Site Desc:

Comments: 4-FEB-2019 Total Nitrogen result added on L2059920-1 to -7.

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2059920-1	L2059920-2	L2059920-3	L2059920-4	L2059920-5
Description	WG	WG	WG	WG	WG
Sampled Date	21-FEB-18	21-FEB-18	21-FEB-18	21-FEB-18	21-FEB-18
Sampled Time	14:40	14:45	14:50	14:35	11:40
Client ID	EV_MC5GW_WG_2018-02_NP	EV_MC6GW_WG_2018-02_NP	EV_MC7GW_WG_2018-02_NP	EV_OCGW_WG_2018-02_NP	EV_ER1GWS_WG_2018-02_NP
Grouping / **Analyte**					
WATER					
Physical Tests Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (@ 25C) (uS/cm)	465	<2.0	<2.0	473	577
Hardness (as CaCO3) (mg/L)	143	<0.50	<0.50	145	277
pH (pH)	8.02	5.44	5.40	8.03	7.82
ORP (mV)	285	555	567	264	469
Total Suspended Solids (mg/L)	8.4	<1.0	<1.0	11.2	<1.0
Total Dissolved Solids (mg/L)	286 DLHC	<10	<10	284 DLHC	355 DLHC
Turbidity (NTU)	5.39	<0.10	<0.10	9.01	0.17
Anions and Nutrients Acidity (as CaCO3) (mg/L)	1.2	1.2	1.3	<1.0	2.7
Alkalinity, Bicarbonate (as CaCO3) (mg/L)	201	1.0	<1.0	177	252
Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	201	1.0	<1.0	177	252
Ammonia as N (mg/L)	0.0611	0.0084	0.0213	0.0614 RRV	0.0077
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	1.71	<0.50	<0.50	1.69	10.4
Fluoride (F) (mg/L)	1.20	<0.020	<0.020	1.20	0.122
Ion Balance (%)	89.7	22.3	0.0	98.9	82.2
Nitrate (as N) (mg/L)	0.0284	<0.0050	<0.0050	0.0207	2.08
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	0.0021	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.074	<0.050	<0.050	0.237	0.54 DLM
Total Nitrogen (mg/L)	0.102	<0.050	<0.050	0.260	2.61
Orthophosphate-Dissolved (as P) (mg/L)	0.0068	<0.0010	<0.0010	0.0070	0.0026
Phosphorus (P)-Total (mg/L)	0.0226	<0.0010	<0.0010	0.0237	0.0039
Sulfate (SO4) (mg/L)	60.4	<0.30	<0.30	62.3	82.2
Anion Sum (meq/L)	5.39	<0.10	<0.10	4.94	7.19
Cation Sum (meq/L)	4.84	<0.10	<0.10	4.88	5.91
Cation - Anion Balance (%)	-5.4	-63.5	0.0	-0.5	-9.8
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	<0.50	<0.50		<0.50	<0.50
Total Organic Carbon (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Metals Dissolved Mercury Filtration Location	LAB	LAB	FIELD	LAB	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00132	<0.00010	<0.00010	0.00122	0.00012
Barium (Ba)-Dissolved (mg/L)	0.0587	<0.00010	<0.00010	0.0590	0.133

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2059920-6	L2059920-7			
	Description	WG	WG			
	Sampled Date	21-FEB-18	21-FEB-18			
	Sampled Time	12:40	09:30			
	Client ID	EV_ER1GWD_WG_2018-02_NP	EV_GCGW_WG_2018-02_NP			
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0			
	Conductivity (@ 25C) (uS/cm)	507	441			
	Hardness (as CaCO3) (mg/L)	247	209			
	pH (pH)	7.89	7.76			
	ORP (mV)	306	289			
	Total Suspended Solids (mg/L)	45.8	37.4			
	Total Dissolved Solids (mg/L)	326 DLHC	266 DLHC			
	Turbidity (NTU)	22.8	22.4			
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	2.7	1.8			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	182	201			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	182	201			
	Ammonia as N (mg/L)	0.0075	0.0264			
	Bromide (Br) (mg/L)	<0.050	<0.25 DLHC			
	Chloride (Cl) (mg/L)	3.83	2.7 DLHC			
	Fluoride (F) (mg/L)	0.164	0.38 DLHC			
	Ion Balance (%)	93.4	78.3			
	Nitrate (as N) (mg/L)	1.93	<0.025 DLHC			
	Nitrite (as N) (mg/L)	<0.0010	<0.0050 DLHC			
	Total Kjeldahl Nitrogen (mg/L)	0.40 DLM	0.089			
	Total Nitrogen (mg/L)	2.33	0.089			
	Orthophosphate-Dissolved (as P) (mg/L)	0.0030	<0.0010			
	Phosphorus (P)-Total (mg/L)	0.0791	0.0232			
	Sulfate (SO4) (mg/L)	75.3	71.0			
	Anion Sum (meq/L)	5.45	5.59			
	Cation Sum (meq/L)	5.10	4.38			
	Cation - Anion Balance (%)	-3.4	-12.2			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50	<0.50			
	Total Organic Carbon (mg/L)	<0.50	0.84			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0092	<0.0030			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00012	0.00157			
	Barium (Ba)-Dissolved (mg/L)	0.0902	0.0789			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2059920-1	L2059920-2	L2059920-3	L2059920-4	L2059920-5
	Description	WG	WG	WG	WG	WG
	Sampled Date	21-FEB-18	21-FEB-18	21-FEB-18	21-FEB-18	21-FEB-18
	Sampled Time	14:40	14:45	14:50	14:35	11:40
	Client ID	EV_MC5GW_WG_2018-02_NP	EV_MC6GW_WG_2018-02_NP	EV_MC7GW_WG_2018-02_NP	EV_OCGW_WG_2018-02_NP	EV_ER1GWS_WG_2018-02_NP
Grouping	**Analyte**					
WATER						
Dissolved Metals	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	0.122	<0.010	<0.010	0.120	0.011
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050	<0.0050	<0.0050	0.0163
	Calcium (Ca)-Dissolved (mg/L)	26.0	<0.050	<0.050	26.9	71.4
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00034
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	0.00072	0.00490
	Iron (Fe)-Dissolved (mg/L)	0.239	0.015 RRV	<0.010	0.245	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0231	<0.0010	<0.0010	0.0228	0.0073
	Magnesium (Mg)-Dissolved (mg/L)	19.0	<0.10	<0.10	19.0	23.9
	Manganese (Mn)-Dissolved (mg/L)	0.0767	<0.00010	<0.00010	0.0741	0.00077
	Mercury (Hg)-Dissolved (mg/L)			<0.0000050		<0.0000050
	Mercury (Hg)-Dissolved (ug/L)	<0.00050	<0.00050		<0.00050	
	Molybdenum (Mo)-Dissolved (mg/L)	0.0137	<0.000050	<0.000050	0.0124	0.000966
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)-Dissolved (mg/L)	1.62	<0.050	<0.050	1.66	0.803
	Selenium (Se)-Dissolved (ug/L)	0.087	<0.050	<0.050	<0.050	10.8
	Silicon (Si)-Dissolved (mg/L)	4.44	<0.050	<0.050	5.25	2.49
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	44.1	<0.050	<0.050	44.1	8.31
	Strontium (Sr)-Dissolved (mg/L)	0.412	<0.00020	<0.00020	0.406	0.235
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00112	<0.000010	<0.000010	0.00106	0.00110
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	0.0078
Hydrocarbons	EPH10-19 (mg/L)	<0.25	<0.25	<0.25	<0.25	
	EPH (C10-C32) (mg/L)	<0.50	<0.50	<0.50	<0.50	
	EPH19-32 (mg/L)	<0.25	<0.25	<0.25	<0.25	
	TEH (C10-C30) (mg/L)	<0.25	<0.25	<0.25	<0.25	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2059920-6	L2059920-7			
	Description	WG	WG			
	Sampled Date	21-FEB-18	21-FEB-18			
	Sampled Time	12:40	09:30			
	Client ID	EV_ER1GWD_WG_2018-02_NP	EV_GCGW_WG_2018-02_NP			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.00010 DLM			
	Boron (B)-Dissolved (mg/L)	<0.010	0.013			
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050			
	Calcium (Ca)-Dissolved (mg/L)	60.9	55.7			
	Chromium (Cr)-Dissolved (mg/L)	0.00035	<0.00010			
	Cobalt (Co)-Dissolved (ug/L)	<0.10	0.18			
	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Dissolved (mg/L)	<0.010	0.196			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	0.0062	0.0067			
	Magnesium (Mg)-Dissolved (mg/L)	23.0	17.0			
	Manganese (Mn)-Dissolved (mg/L)	0.00047	0.0830			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Mercury (Hg)-Dissolved (ug/L)					
	Molybdenum (Mo)-Dissolved (mg/L)	0.00115	0.00208			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00062			
	Potassium (K)-Dissolved (mg/L)	0.640	0.789			
	Selenium (Se)-Dissolved (ug/L)	10.1	<0.050			
	Silicon (Si)-Dissolved (mg/L)	2.45	4.32			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	3.34	3.80			
	Strontium (Sr)-Dissolved (mg/L)	0.215	0.264			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000032			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.00143	0.00111			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0030	<0.0030			
Hydrocarbons	EPH10-19 (mg/L)					
	EPH (C10-C32) (mg/L)					
	EPH19-32 (mg/L)					
	TEH (C10-C30) (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2059920-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2059920-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2059920-2
Matrix Spike	Copper (Cu)-Dissolved	MS-B	L2059920-2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2059920-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2059920-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2059920-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2059920-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2059920-2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

Reference Information

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

EPH(10-32)-CALC-CL Water Sum of EPH (10-32) Sum of EPH - Auto Calculated

The sum of EPH(C10-C19) and EPH(C19-C32)

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-D-U-CVAF-VA Water Diss. Mercury in Water by CVAFS (Ultra) APHA 3030 B / EPA 1631 REV. E

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure may involve preliminary sample treatment by filtration (APHA 3030B) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Reference Information

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TEH-BC-VA-CL	Water	EPH (C10-C19) & EPH (C19-C32)	BCMOE EPH GCFID

Analysis is in accordance with BC MOE Lab Manual method "Extractable Petroleum Hydrocarbons in Water by GC/FID", v2.1, July 1999. Whole water samples are extracted with DCM prior to gas chromatography with flame ionization detection (GC-FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

TEH-WATER-VA-CL	Water	TEH (C10-C30)	EPA 3510/8000-GC-FID
TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180221Q1GW

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R3973230								
WG2725003-2 LCS								
Acidity (as CaCO3)			112.0		%		85-115	01-MAR-18
WG2725003-1 MB								
Acidity (as CaCO3)			1.3		mg/L		2	01-MAR-18
ALK-MAN-CL	**Water**							
Batch R3970647								
WG2722525-14 LCS								
Alkalinity, Total (as CaCO3)			104.0		%		85-115	25-FEB-18
WG2722525-17 LCS								
Alkalinity, Total (as CaCO3)			102.9		%		85-115	25-FEB-18
WG2722525-13 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	25-FEB-18
WG2722525-16 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	25-FEB-18
BE-D-L-CCMS-VA	**Water**							
Batch R3971746								
WG2722307-2 LCS								
Beryllium (Be)-Dissolved			89.6		%		80-120	26-FEB-18
WG2722307-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	26-FEB-18
WG2722307-4 MS		**L2059920-7**						
Beryllium (Be)-Dissolved			87.2		%		70-130	26-FEB-18
BR-L-IC-N-CL	**Water**							
Batch R3971772								
WG2723311-7 DUP		**L2059920-2**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	23-FEB-18
WG2723311-6 LCS								
Bromide (Br)			93.8		%		85-115	23-FEB-18
WG2723311-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	23-FEB-18
WG2723311-8 MS		**L2059920-2**						
Bromide (Br)			95.7		%		75-125	23-FEB-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R3974913								
WG2725804-2 LCS								
Dissolved Organic Carbon			96.4		%		80-120	02-MAR-18
WG2725804-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R3974913								
WG2725804-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R3974913								
WG2725804-2 LCS								
Total Organic Carbon			95.7		%		80-120	02-MAR-18
WG2725804-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
CL-IC-N-CL	**Water**							
Batch R3971772								
WG2723311-7 DUP		**L2059920-2**						
Chloride (Cl)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	23-FEB-18
WG2723311-6 LCS								
Chloride (Cl)			99.2		%		90-110	23-FEB-18
WG2723311-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	23-FEB-18
WG2723311-8 MS		**L2059920-2**						
Chloride (Cl)			102.3		%		75-125	23-FEB-18
COLOUR-TRUE-CL	**Water**							
Batch R3968614								
WG2721658-2 LCS								
Colour, True			104.9		%		85-115	23-FEB-18
WG2721658-1 MB								
Colour, True			<5.0		CU		5	23-FEB-18
EC-L-PCT-CL	**Water**							
Batch R3970647								
WG2722525-14 LCS								
Conductivity (@ 25C)			103.3		%		90-110	25-FEB-18
WG2722525-17 LCS								
Conductivity (@ 25C)			106.3		%		90-110	25-FEB-18
WG2722525-13 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	25-FEB-18
WG2722525-16 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	25-FEB-18
F-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-CL	**Water**							
Batch R3971772								
WG2723311-7 DUP		**L2059920-2**						
Fluoride (F)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	23-FEB-18
WG2723311-6 LCS								
Fluoride (F)			104.5		%		90-110	23-FEB-18
WG2723311-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	23-FEB-18
WG2723311-8 MS		**L2059920-2**						
Fluoride (F)			96.5		%		75-125	23-FEB-18
HG-D-CVAA-VA	**Water**							
Batch R3970248								
WG2722123-2 LCS								
Mercury (Hg)-Dissolved			100.3		%		80-120	26-FEB-18
Batch R3971670								
WG2722123-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	27-FEB-18
HG-D-U-CVAF-VA	**Water**							
Batch R3971902								
WG2722551-2 LCS								
Mercury (Hg)-Dissolved			102.6		%		80-120	27-FEB-18
WG2722551-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.00050		ug/L		0.0005	27-FEB-18
Batch R3972544								
WG2724227-2 LCS								
Mercury (Hg)-Dissolved			102.8		%		80-120	28-FEB-18
WG2724227-1 MB								
Mercury (Hg)-Dissolved			<0.00050		ug/L		0.0005	28-FEB-18
MET-D-CCMS-VA	**Water**							
Batch R3971746								
WG2722307-2 LCS								
Aluminum (Al)-Dissolved			101.5		%		80-120	26-FEB-18
Antimony (Sb)-Dissolved			95.1		%		80-120	26-FEB-18
Arsenic (As)-Dissolved			96.1		%		80-120	26-FEB-18
Barium (Ba)-Dissolved			101.7		%		80-120	26-FEB-18
Bismuth (Bi)-Dissolved			89.3		%		80-120	26-FEB-18
Boron (B)-Dissolved			91.5		%		80-120	26-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3971746								
WG2722307-2 LCS								
Cadmium (Cd)-Dissolved			93.0		%		80-120	26-FEB-18
Calcium (Ca)-Dissolved			89.4		%		80-120	26-FEB-18
Chromium (Cr)-Dissolved			94.2		%		80-120	26-FEB-18
Cobalt (Co)-Dissolved			96.7		%		80-120	26-FEB-18
Copper (Cu)-Dissolved			97.5		%		80-120	26-FEB-18
Iron (Fe)-Dissolved			110.7		%		80-120	26-FEB-18
Lead (Pb)-Dissolved			94.7		%		80-120	26-FEB-18
Lithium (Li)-Dissolved			87.5		%		80-120	26-FEB-18
Magnesium (Mg)-Dissolved			97.3		%		80-120	26-FEB-18
Manganese (Mn)-Dissolved			99.4		%		80-120	26-FEB-18
Molybdenum (Mo)-Dissolved			91.2		%		80-120	26-FEB-18
Nickel (Ni)-Dissolved			97.2		%		80-120	26-FEB-18
Potassium (K)-Dissolved			101.2		%		80-120	26-FEB-18
Selenium (Se)-Dissolved			104.1		%		80-120	26-FEB-18
Silicon (Si)-Dissolved			107.4		%		80-120	26-FEB-18
Silver (Ag)-Dissolved			89.9		%		80-120	26-FEB-18
Sodium (Na)-Dissolved			102.7		%		80-120	26-FEB-18
Strontium (Sr)-Dissolved			96.6		%		80-120	26-FEB-18
Thallium (Tl)-Dissolved			96.6		%		80-120	26-FEB-18
Tin (Sn)-Dissolved			92.2		%		80-120	26-FEB-18
Titanium (Ti)-Dissolved			97.0		%		80-120	26-FEB-18
Uranium (U)-Dissolved			91.8		%		80-120	26-FEB-18
Vanadium (V)-Dissolved			98.2		%		80-120	26-FEB-18
Zinc (Zn)-Dissolved			95.0		%		80-120	26-FEB-18
WG2722307-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	26-FEB-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	26-FEB-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	26-FEB-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	26-FEB-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	26-FEB-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	26-FEB-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	26-FEB-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	26-FEB-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	26-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3971746								
WG2722307-1 MB		**NP**						
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	26-FEB-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	26-FEB-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	26-FEB-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	26-FEB-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	26-FEB-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	26-FEB-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	26-FEB-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	26-FEB-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	26-FEB-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	26-FEB-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	26-FEB-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	26-FEB-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	26-FEB-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	26-FEB-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	26-FEB-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	26-FEB-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	26-FEB-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	26-FEB-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	26-FEB-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	26-FEB-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	26-FEB-18
WG2722307-4 MS		**L2059920-7**						
Aluminum (Al)-Dissolved			100.1		%		70-130	26-FEB-18
Antimony (Sb)-Dissolved			94.7		%		70-130	26-FEB-18
Arsenic (As)-Dissolved			97.4		%		70-130	26-FEB-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	26-FEB-18
Boron (B)-Dissolved			91.8		%		70-130	26-FEB-18
Cadmium (Cd)-Dissolved			98.0		%		70-130	26-FEB-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	26-FEB-18
Chromium (Cr)-Dissolved			93.8		%		70-130	26-FEB-18
Cobalt (Co)-Dissolved			93.8		%		70-130	26-FEB-18
Copper (Cu)-Dissolved			93.7		%		70-130	26-FEB-18
Iron (Fe)-Dissolved			93.3		%		70-130	26-FEB-18
Lead (Pb)-Dissolved			93.5		%		70-130	26-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch	**R3971746**							
WG2722307-4	**MS**	**L2059920-7**						
Lithium (Li)-Dissolved			94.0		%		70-130	26-FEB-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	26-FEB-18
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	26-FEB-18
Molybdenum (Mo)-Dissolved			91.6		%		70-130	26-FEB-18
Nickel (Ni)-Dissolved			92.6		%		70-130	26-FEB-18
Potassium (K)-Dissolved			100.3		%		70-130	26-FEB-18
Selenium (Se)-Dissolved			98.1		%		70-130	26-FEB-18
Silicon (Si)-Dissolved			90.5		%		70-130	26-FEB-18
Silver (Ag)-Dissolved			92.4		%		70-130	26-FEB-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	26-FEB-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	26-FEB-18
Thallium (Tl)-Dissolved			91.9		%		70-130	26-FEB-18
Tin (Sn)-Dissolved			96.0		%		70-130	26-FEB-18
Titanium (Ti)-Dissolved			95.7		%		70-130	26-FEB-18
Uranium (U)-Dissolved			98.3		%		70-130	26-FEB-18
Vanadium (V)-Dissolved			97.0		%		70-130	26-FEB-18
Zinc (Zn)-Dissolved			95.2		%		70-130	26-FEB-18
Batch	**R3971991**							
WG2723336-2	**LCS**							
Aluminum (Al)-Dissolved			96.0		%		80-120	27-FEB-18
Antimony (Sb)-Dissolved			92.5		%		80-120	27-FEB-18
Arsenic (As)-Dissolved			93.4		%		80-120	27-FEB-18
Barium (Ba)-Dissolved			91.6		%		80-120	27-FEB-18
Bismuth (Bi)-Dissolved			93.6		%		80-120	27-FEB-18
Boron (B)-Dissolved			88.4		%		80-120	27-FEB-18
Cadmium (Cd)-Dissolved			94.2		%		80-120	27-FEB-18
Calcium (Ca)-Dissolved			88.5		%		80-120	27-FEB-18
Chromium (Cr)-Dissolved			82.4		%		80-120	27-FEB-18
Cobalt (Co)-Dissolved			91.0		%		80-120	27-FEB-18
Copper (Cu)-Dissolved			92.2		%		80-120	27-FEB-18
Iron (Fe)-Dissolved			90.6		%		80-120	27-FEB-18
Lead (Pb)-Dissolved			93.7		%		80-120	27-FEB-18
Lithium (Li)-Dissolved			91.2		%		80-120	27-FEB-18
Magnesium (Mg)-Dissolved			95.0		%		80-120	27-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3971991								
WG2723336-2 LCS								
Manganese (Mn)-Dissolved			87.0		%		80-120	27-FEB-18
Molybdenum (Mo)-Dissolved			95.0		%		80-120	27-FEB-18
Nickel (Ni)-Dissolved			92.8		%		80-120	27-FEB-18
Potassium (K)-Dissolved			91.3		%		80-120	27-FEB-18
Selenium (Se)-Dissolved			98.4		%		80-120	27-FEB-18
Silicon (Si)-Dissolved			96.8		%		80-120	27-FEB-18
Silver (Ag)-Dissolved			93.2		%		80-120	27-FEB-18
Sodium (Na)-Dissolved			89.7		%		80-120	27-FEB-18
Strontium (Sr)-Dissolved			91.2		%		80-120	27-FEB-18
Thallium (Tl)-Dissolved			93.7		%		80-120	27-FEB-18
Tin (Sn)-Dissolved			93.9		%		80-120	27-FEB-18
Titanium (Ti)-Dissolved			91.2		%		80-120	27-FEB-18
Uranium (U)-Dissolved			93.9		%		80-120	27-FEB-18
Vanadium (V)-Dissolved			91.7		%		80-120	27-FEB-18
Zinc (Zn)-Dissolved			88.5		%		80-120	27-FEB-18
WG2723336-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	27-FEB-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	27-FEB-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	27-FEB-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	27-FEB-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	27-FEB-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	27-FEB-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	27-FEB-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	27-FEB-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	27-FEB-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	27-FEB-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	27-FEB-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	27-FEB-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	27-FEB-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	27-FEB-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	27-FEB-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	27-FEB-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	27-FEB-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	27-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3971991								
WG2723336-1 MB		**NP**						
Potassium (K)-Dissolved			<0.050		mg/L		0.05	27-FEB-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	27-FEB-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	27-FEB-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	27-FEB-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	27-FEB-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	27-FEB-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	27-FEB-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	27-FEB-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	27-FEB-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	27-FEB-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	27-FEB-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	27-FEB-18
NH3-L-F-CL	**Water**							
Batch R3973259								
WG2725017-11 DUP		**L2059920-7**						
Ammonia as N		0.0264	0.0266		mg/L	0.8	20	01-MAR-18
WG2725017-10 LCS								
Ammonia as N			102.2		%		85-115	01-MAR-18
WG2725017-14 LCS								
Ammonia as N			100.7		%		85-115	01-MAR-18
WG2725017-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	01-MAR-18
WG2725017-9 MB								
Ammonia as N			<0.0050		mg/L		0.005	01-MAR-18
WG2725017-12 MS		**L2059920-7**						
Ammonia as N			105.4		%		75-125	01-MAR-18
NO2-L-IC-N-CL	**Water**							
Batch R3971772								
WG2723311-7 DUP		**L2059920-2**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-FEB-18
WG2723311-6 LCS								
Nitrite (as N)			100.3		%		90-110	23-FEB-18
WG2723311-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	23-FEB-18
WG2723311-8 MS		**L2059920-2**						
Nitrite (as N)			105.0		%		75-125	23-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R3971772								
WG2723311-7 DUP		**L2059920-2**						
Nitrate (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	23-FEB-18
WG2723311-6 LCS								
Nitrate (as N)			99.6		%		90-110	23-FEB-18
WG2723311-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	23-FEB-18
WG2723311-8 MS		**L2059920-2**						
Nitrate (as N)			101.9		%		75-125	23-FEB-18
ORP-CL	**Water**							
Batch R3972482								
WG2723747-5 CRM		**CL-ORP**						
ORP			213		mV		210-230	27-FEB-18
P-T-L-COL-ED	**Water**							
Batch R3973226								
WG2724576-14 LCS								
Phosphorus (P)-Total			103.8		%		80-120	01-MAR-18
WG2724576-16 LCS								
Phosphorus (P)-Total			103.4		%		80-120	01-MAR-18
WG2724576-18 LCS								
Phosphorus (P)-Total			105.4		%		80-120	01-MAR-18
WG2724576-2 LCS								
Phosphorus (P)-Total			103.0		%		80-120	01-MAR-18
WG2724576-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	01-MAR-18
WG2724576-13 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	01-MAR-18
WG2724576-15 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	01-MAR-18
WG2724576-17 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	01-MAR-18
PH-CL	**Water**							
Batch R3970647								
WG2722525-14 LCS								
pH			6.90		pH		6.9-7.1	25-FEB-18
WG2722525-17 LCS								
pH			6.97		pH		6.9-7.1	25-FEB-18
PO4-DO-L-COL-ED	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-L-COL-ED	**Water**							
Batch R3968819								
WG2721789-3 DUP		**L2059920-7**						
Orthophosphate-Dissolved (as P)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-FEB-18
WG2721789-10 LCS								
Orthophosphate-Dissolved (as P)			94.8		%		80-120	24-FEB-18
WG2721789-2 LCS								
Orthophosphate-Dissolved (as P)			94.8		%		80-120	24-FEB-18
WG2721789-6 LCS								
Orthophosphate-Dissolved (as P)			92.2		%		80-120	24-FEB-18
WG2721789-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	24-FEB-18
WG2721789-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	24-FEB-18
WG2721789-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	24-FEB-18
WG2721789-4 MS		**L2059920-7**						
Orthophosphate-Dissolved (as P)			94.0		%		70-130	24-FEB-18
SO4-IC-N-CL	**Water**							
Batch R3971772								
WG2723311-7 DUP		**L2059920-2**						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	23-FEB-18
WG2723311-6 LCS								
Sulfate (SO4)			100.3		%		90-110	23-FEB-18
WG2723311-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	23-FEB-18
WG2723311-8 MS		**L2059920-2**						
Sulfate (SO4)			103.9		%		75-125	23-FEB-18
SOLIDS-TDS-CL	**Water**							
Batch R3973240								
WG2723865-3 DUP		**L2059920-1**						
Total Dissolved Solids		286	283		mg/L	1.1	20	28-FEB-18
WG2723865-2 LCS								
Total Dissolved Solids			104.3		%		85-115	28-FEB-18
WG2723865-1 MB								
Total Dissolved Solids			<10		mg/L		10	28-FEB-18
TEH-BC-VA-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TEH-BC-VA-CL	**Water**							
Batch R3972999								
WG2724341-2 LCS								
EPH10-19			102.8		%		50-150	27-FEB-18
EPH19-32			107.7		%		50-150	27-FEB-18
WG2724341-1 MB								
EPH10-19			<0.25		mg/L		0.25	27-FEB-18
EPH19-32			<0.25		mg/L		0.25	27-FEB-18
TEH-WATER-VA-CL	**Water**							
Batch R3972999								
WG2724341-2 LCS								
TEH (C10-C30)			103.2		%		50-150	27-FEB-18
WG2724341-1 MB								
TEH (C10-C30)			<0.25		mg/L		0.25	27-FEB-18
TKN-L-F-CL	**Water**							
Batch R3972178								
WG2723122-2 LCS								
Total Kjeldahl Nitrogen			106.9		%		75-125	27-FEB-18
WG2723122-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	27-FEB-18
TSS-L-CL	**Water**							
Batch R3972485								
WG2723754-2 LCS								
Total Suspended Solids			100.4		%		85-115	27-FEB-18
WG2723754-1 MB								
Total Suspended Solids			<1.0		mg/L		1	27-FEB-18
TURBIDITY-CL	**Water**							
Batch R3968797								
WG2721517-11 LCS								
Turbidity			95.5		%		85-115	23-FEB-18
WG2721517-8 LCS								
Turbidity			97.5		%		85-115	23-FEB-18
WG2721517-10 MB								
Turbidity			<0.10		NTU		0.1	23-FEB-18
WG2721517-7 MB								
Turbidity			<0.10		NTU		0.1	23-FEB-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	21-FEB-18 14:40	25-FEB-18 11:00	0.25	92	hours	EHTR-FM
	2	21-FEB-18 14:45	25-FEB-18 11:00	0.25	92	hours	EHTR-FM
	3	21-FEB-18 14:50	25-FEB-18 11:00	0.25	92	hours	EHTR-FM
	4	21-FEB-18 14:35	25-FEB-18 11:00	0.25	92	hours	EHTR-FM
	5	21-FEB-18 11:40	25-FEB-18 11:00	0.25	95	hours	EHTR-FM
	6	21-FEB-18 12:40	25-FEB-18 11:00	0.25	94	hours	EHTR-FM
	7	21-FEB-18 09:30	25-FEB-18 11:00	0.25	97	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2059920 were received on 22-FEB-18 09:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 20180221Q1GW | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations
Job Description	Q1 Ground Water Sampling
Project Manager	Cameron Griffin
Email	Cameron.Griffin@Teck.com
Address	RR#1 HWY# 3
City	Sparwood
Province	BC
Postal Code	V1C 4C3
Country	Canada
Phone Number	1-250-865-5289

LABORATORY

Lab Name	ALS Calgary
Lab Contact	Lyudmyla Shvets
Email	Lyudmyla.Shvets@alsglobal.com
Address	2559 29 St NE
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Province	AB
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OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
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Email 3:	James.Boldt@teck.com	X	X	X
Email 4:	Cameron.Griffin@teck.com	X	X	X
Email 5:	Teck.Lab.Results@theregpoint.teck.com	X	X	X
PO #	5387000			

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTERED	PRESERVED	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	TKN/TOC (APHA 4500-NORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	T-METHYL MERCURY	PAH, EPH (C10-C12)	EPH (C10-C32)	T-Mercury	D-Mercury
										No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
												Nitric	Sulphuric	Sulphuric			HCl	Sodium Hydroxide	Sodium Hydroxide	HCl	HCl
EV_MC5gw_WG_2018-02_NP	EV_MC5gw	WG	N	02/21/2018	14:40	G	7			1		1	1	1		1			2		
EV_MC6gw_WG_2018-02_NP	EV_MC6gw	WG	N	02/21/2018	14:45	G	7			1		1	1	1		1			2		
EV_MC7gw_WG_2018-02_NP	EV_MC7gw	WG	N	02/21/2018	14:50	G	6			1		1		1					1		1
EV_OCgw_WG_2018-02_NP	EV_OCgw	WG	N	02/21/2018	14:35	G	7			1		1	1	1		1			2		
EV_ER1gwS_WG_2018-02_NP	EV_ER1gwS	WG	N	02/21/2018	11:40	G	5			1		1	1	1							1
EV_ER1gwD_WG_2018-02_NP	EV_ER1gwD	WG	N	02/21/2018	12:40	G	5			1		1	1	1							1
EV_GCgw_WG_2018-02_NP	EV_GCgw	WG	N	02/21/2018	9:30	G	5			1		1	1	1							1
					Total		42														

1 2 3 4 5 6 7

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Ultra-trace Mercury samples are unfiltered and unpreserved

Total Methyl Mercury samples are preserved but unfiltered

Total Selenium samples are preserved but unfiltered

Dissolved Selenium samples are preserved and filtered

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Bryan Ogden	February 21, 2018	[illegible]	22-Feb-18 9:00

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Bryan Ogden	Mobile #	250 425 3629
Sampler's Signature	[signature]	Date/Time	February 21, 2018

L2059920-COFC

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 09-MAR-18
Report Date: 04-FEB-19 17:49 (MT)
Version: FINAL REV. 2

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2065995

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180308Q1GW
Legal Site Desc:

Comments: 4-FEB-2019 Total Nitrogen result added on L2065995-1 and -2.

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2065995-1	L2065995-2			
	Description	WG	WG			
	Sampled Date	08-MAR-18	08-MAR-18			
	Sampled Time	13:00	14:25			
	Client ID	EV_MCGWS_WG_2018-03-08_NP	EV_MCGWD_WG_2018-03-08_NP			
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0			
	Conductivity (@ 25C) (uS/cm)	792	533			
	Hardness (as CaCO3) (mg/L)	366	239			
	pH (pH)	8.12	8.41			
	ORP (mV)	315	240			
	Total Suspended Solids (mg/L)	5.8	34.0			
	Total Dissolved Solids (mg/L)	513 DLHC	321 DLHC			
	Turbidity (NTU)	22.3	25.8			
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	4.2	<1.0			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	250	221			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	12.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	250	233			
	Ammonia as N (mg/L)	0.126	0.0142			
	Bromide (Br) (mg/L)	0.206	0.077			
	Chloride (Cl) (mg/L)	40.8	6.49			
	Fluoride (F) (mg/L)	0.259	0.873			
	Ion Balance (%)	102	98.7			
	Nitrate (as N) (mg/L)	<0.0050	0.102			
	Nitrite (as N) (mg/L)	<0.0010	0.0045			
	Total Kjeldahl Nitrogen (mg/L)	0.121	0.219			
	Total Nitrogen (mg/L)	0.121	0.326			
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010			
	Phosphorus (P)-Total (mg/L)	0.0039	0.0433			
	Sulfate (SO4) (mg/L)	109	47.1			
	Anion Sum (meq/L)	8.43	5.87			
	Cation Sum (meq/L)	8.61	5.80			
	Cation - Anion Balance (%)	1.1	-0.7			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.59 RRV	1.91			
	Total Organic Carbon (mg/L)	1.17	2.38			
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	0.00025			
	Arsenic (As)-Dissolved (mg/L)	0.00124	0.00068			
	Barium (Ba)-Dissolved (mg/L)	0.0240	0.0829			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2065995-1	L2065995-2			
	Description	WG	WG			
	Sampled Date	08-MAR-18	08-MAR-18			
	Sampled Time	13:00	14:25			
	Client ID	EV_MCGWS_WG_2018-03-08_NP	EV_MCGWD_WG_2018-03-08_NP			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	0.023	0.063			
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	0.0503			
	Calcium (Ca)-Dissolved (mg/L)	91.7	52.6			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Dissolved (ug/L)	<0.10	0.84			
	Copper (Cu)-Dissolved (mg/L)	<0.00050	0.00364			
	Iron (Fe)-Dissolved (mg/L)	1.90	<0.010			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	0.0238	0.0087			
	Magnesium (Mg)-Dissolved (mg/L)	33.3	26.0			
	Manganese (Mn)-Dissolved (mg/L)	0.114	0.388			
	Mercury (Hg)-Dissolved (ug/L)	<0.00050	<0.00050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.00313	0.0118			
	Nickel (Ni)-Dissolved (mg/L)	0.00057	0.0159			
	Potassium (K)-Dissolved (mg/L)	1.69	1.66			
	Selenium (Se)-Dissolved (ug/L)	<0.050	0.189			
	Silicon (Si)-Dissolved (mg/L)	4.93	4.91			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	26.1	22.3			
	Strontium (Sr)-Dissolved (mg/L)	0.291	0.506			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000074			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.00188	0.00244			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0030	0.0284			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC, DIS METALS

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2065995-1, -2
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2065995-1, -2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2065995-1, -2
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2065995-1, -2
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2065995-1, -2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2065995-1, -2
Matrix Spike	Ammonia as N	MS-B	L2065995-1, -2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

Reference Information

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-U-CVAF-VA Water Diss. Mercury in Water by CVAFS (Ultra) APHA 3030 B / EPA 1631 REV. E

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure may involve preliminary sample treatment by filtration (APHA 3030B) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Reference Information

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180308Q1GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R3985854								
WG2732986-18 DUP		**L2065995-2**						
Acidity (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	14-MAR-18
WG2732986-17 LCS								
Acidity (as CaCO3)			103.7		%		85-115	14-MAR-18
WG2732986-16 MB								
Acidity (as CaCO3)			1.5		mg/L		2	14-MAR-18
ALK-MAN-CL	**Water**							
Batch R3986687								
WG2733995-12 DUP		**L2065995-1**						
Alkalinity, Total (as CaCO3)		250	258		mg/L	3.2	20	15-MAR-18
WG2733995-11 LCS								
Alkalinity, Total (as CaCO3)			103.6		%		85-115	15-MAR-18
WG2733995-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	15-MAR-18
BE-D-L-CCMS-VA	**Water**							
Batch R3987321								
WG2732702-2 LCS								
Beryllium (Be)-Dissolved			110.7		%		80-120	17-MAR-18
WG2732702-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	17-MAR-18
Batch R3987671								
WG2732702-3 DUP		**L2065995-1**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	18-MAR-18
WG2732702-4 MS		**L2065995-2**						
Beryllium (Be)-Dissolved			93.1		%		70-130	18-MAR-18
BR-L-IC-N-CL	**Water**							
Batch R3983452								
WG2730911-10 LCS								
Bromide (Br)			99.6		%		85-115	09-MAR-18
WG2730911-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	09-MAR-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R3986613								
WG2733918-2 LCS								
Dissolved Organic Carbon			98.0		%		80-120	15-MAR-18
WG2733918-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	15-MAR-18
WG2733918-4		**L2065995-1**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R3986613								
WG2733918-4 MS		**L2065995-1**						
Dissolved Organic Carbon			102.9		%		70-130	15-MAR-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R3986613								
WG2733918-2 LCS								
Total Organic Carbon			95.7		%		80-120	15-MAR-18
WG2733918-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	15-MAR-18
WG2733918-4 MS		**L2065995-1**						
Total Organic Carbon			109.5		%		70-130	15-MAR-18
CL-IC-N-CL	**Water**							
Batch R3983452								
WG2730911-10 LCS								
Chloride (Cl)			99.2		%		90-110	09-MAR-18
WG2730911-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	09-MAR-18
COLOUR-TRUE-CL	**Water**							
Batch R3982207								
WG2730497-3 DUP		**L2065995-1**						
Colour, True		<5.0	<5.0	RPD-NA	CU	N/A	20	11-MAR-18
WG2730497-2 LCS								
Colour, True			100.7		%		85-115	11-MAR-18
WG2730497-1 MB								
Colour, True			<5.0		CU		5	11-MAR-18
EC-L-PCT-CL	**Water**							
Batch R3986687								
WG2733995-12 DUP		**L2065995-1**						
Conductivity (@ 25C)		792	800		uS/cm	1.0	10	15-MAR-18
WG2733995-11 LCS								
Conductivity (@ 25C)			102.7		%		90-110	15-MAR-18
WG2733995-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	15-MAR-18
F-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-CL	**Water**							
Batch R3983452								
WG2730911-10 LCS								
Fluoride (F)			98.1		%		90-110	09-MAR-18
WG2730911-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	09-MAR-18
HG-D-U-CVAF-VA	**Water**							
Batch R3986970								
WG2733534-3 DUP		**L2065995-2**						
Mercury (Hg)-Dissolved		<0.00050	<0.00050	RPD-NA	ug/L	N/A	20	16-MAR-18
WG2733534-2 LCS								
Mercury (Hg)-Dissolved			104.0		%		80-120	16-MAR-18
WG2734201-2 LCS								
Mercury (Hg)-Dissolved			104.0		%		80-120	16-MAR-18
WG2733534-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.00050		ug/L		0.0005	16-MAR-18
WG2734201-1 MB								
Mercury (Hg)-Dissolved			<0.00050		ug/L		0.0005	16-MAR-18
WG2733534-5 MS		**L2065995-1**						
Mercury (Hg)-Dissolved			92.9		%		70-130	16-MAR-18
MET-D-CCMS-VA	**Water**							
Batch R3987321								
WG2732702-2 LCS								
Aluminum (Al)-Dissolved			106.8		%		80-120	17-MAR-18
Antimony (Sb)-Dissolved			102.8		%		80-120	17-MAR-18
Arsenic (As)-Dissolved			104.7		%		80-120	17-MAR-18
Barium (Ba)-Dissolved			113.3		%		80-120	17-MAR-18
Bismuth (Bi)-Dissolved			101.3		%		80-120	17-MAR-18
Boron (B)-Dissolved			100.2		%		80-120	17-MAR-18
Cadmium (Cd)-Dissolved			105.6		%		80-120	17-MAR-18
Calcium (Ca)-Dissolved			107.7		%		80-120	17-MAR-18
Chromium (Cr)-Dissolved			107.3		%		80-120	17-MAR-18
Cobalt (Co)-Dissolved			104.8		%		80-120	17-MAR-18
Copper (Cu)-Dissolved			105.2		%		80-120	17-MAR-18
Iron (Fe)-Dissolved			104.4		%		80-120	17-MAR-18
Lead (Pb)-Dissolved			103.1		%		80-120	17-MAR-18
Lithium (Li)-Dissolved			105.0		%		80-120	17-MAR-18
Magnesium (Mg)-Dissolved			108.1		%		80-120	17-MAR-18
Manganese (Mn)-Dissolved			107.2		%		80-120	17-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch	**R3987321**							
WG2732702-2	**LCS**							
Molybdenum (Mo)-Dissolved			106.9		%		80-120	17-MAR-18
Nickel (Ni)-Dissolved			106.6		%		80-120	17-MAR-18
Potassium (K)-Dissolved			102.9		%		80-120	17-MAR-18
Selenium (Se)-Dissolved			99.0		%		80-120	17-MAR-18
Silicon (Si)-Dissolved			109.4		%		80-120	17-MAR-18
Silver (Ag)-Dissolved			103.1		%		80-120	17-MAR-18
Sodium (Na)-Dissolved			110.1		%		80-120	17-MAR-18
Strontium (Sr)-Dissolved			108.6		%		80-120	17-MAR-18
Thallium (Tl)-Dissolved			100.6		%		80-120	17-MAR-18
Tin (Sn)-Dissolved			104.3		%		80-120	17-MAR-18
Titanium (Ti)-Dissolved			104.7		%		80-120	17-MAR-18
Uranium (U)-Dissolved			107.4		%		80-120	17-MAR-18
Vanadium (V)-Dissolved			105.8		%		80-120	17-MAR-18
Zinc (Zn)-Dissolved			102.5		%		80-120	17-MAR-18
WG2732702-1	**MB**	**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	17-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	17-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	17-MAR-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	17-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	17-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	17-MAR-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	17-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	17-MAR-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	17-MAR-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	17-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	17-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	17-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	17-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	17-MAR-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	17-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	17-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	17-MAR-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	17-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	17-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3987321								
WG2732702-1 MB		**NP**						
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	17-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	17-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	17-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	17-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	17-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	17-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	17-MAR-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	17-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	17-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	17-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	17-MAR-18
Batch R3987671								
WG2732702-3 DUP		**L2065995-1**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	18-MAR-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-MAR-18
Arsenic (As)-Dissolved		0.00124	0.00129		mg/L	3.8	20	18-MAR-18
Barium (Ba)-Dissolved		0.0240	0.0250		mg/L	3.9	20	18-MAR-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-MAR-18
Boron (B)-Dissolved		0.023	0.025		mg/L	8.0	20	18-MAR-18
Cadmium (Cd)-Dissolved		<0.0000050	<0.0000050	RPD-NA	mg/L	N/A	20	18-MAR-18
Calcium (Ca)-Dissolved		91.7	99.4		mg/L	8.0	20	18-MAR-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-MAR-18
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-MAR-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-MAR-18
Iron (Fe)-Dissolved		1.90	1.89		mg/L	0.8	20	18-MAR-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-MAR-18
Lithium (Li)-Dissolved		0.0238	0.0256		mg/L	7.4	20	18-MAR-18
Magnesium (Mg)-Dissolved		33.3	33.0		mg/L	0.9	20	18-MAR-18
Manganese (Mn)-Dissolved		0.114	0.115		mg/L	0.9	20	18-MAR-18
Molybdenum (Mo)-Dissolved		0.00313	0.00330		mg/L	5.3	20	18-MAR-18
Nickel (Ni)-Dissolved		0.00057	0.00058		mg/L	1.6	20	18-MAR-18
Potassium (K)-Dissolved		1.69	1.69		mg/L	0.0	20	18-MAR-18
Selenium (Se)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-MAR-18
Silicon (Si)-Dissolved		4.93	4.87		mg/L	1.2	20	18-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3987671								
WG2732702-3 DUP		**L2065995-1**						
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	18-MAR-18
Sodium (Na)-Dissolved		26.1	26.0		mg/L	0.2	20	18-MAR-18
Strontium (Sr)-Dissolved		0.291	0.304		mg/L	4.3	20	18-MAR-18
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	18-MAR-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-MAR-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	18-MAR-18
Uranium (U)-Dissolved		0.00188	0.00193		mg/L	2.9	20	18-MAR-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-MAR-18
Zinc (Zn)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	18-MAR-18
WG2732702-4 MS		**L2065995-2**						
Aluminum (Al)-Dissolved			96.2		%		70-130	18-MAR-18
Antimony (Sb)-Dissolved			102.9		%		70-130	18-MAR-18
Arsenic (As)-Dissolved			94.9		%		70-130	18-MAR-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	18-MAR-18
Bismuth (Bi)-Dissolved			72.6		%		70-130	18-MAR-18
Boron (B)-Dissolved			92.9		%		70-130	18-MAR-18
Cadmium (Cd)-Dissolved			95.3		%		70-130	18-MAR-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	18-MAR-18
Chromium (Cr)-Dissolved			92.0		%		70-130	18-MAR-18
Cobalt (Co)-Dissolved			90.6		%		70-130	18-MAR-18
Copper (Cu)-Dissolved			89.7		%		70-130	18-MAR-18
Iron (Fe)-Dissolved			93.6		%		70-130	18-MAR-18
Lead (Pb)-Dissolved			90.8		%		70-130	18-MAR-18
Lithium (Li)-Dissolved			88.7		%		70-130	18-MAR-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	18-MAR-18
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	18-MAR-18
Molybdenum (Mo)-Dissolved			100.0		%		70-130	18-MAR-18
Nickel (Ni)-Dissolved			89.0		%		70-130	18-MAR-18
Potassium (K)-Dissolved			91.6		%		70-130	18-MAR-18
Selenium (Se)-Dissolved			99.1		%		70-130	18-MAR-18
Silicon (Si)-Dissolved			90.2		%		70-130	18-MAR-18
Silver (Ag)-Dissolved			92.1		%		70-130	18-MAR-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	18-MAR-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	18-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3987671								
WG2732702-4 MS		**L2065995-2**						
Thallium (Tl)-Dissolved			93.8		%		70-130	18-MAR-18
Tin (Sn)-Dissolved			98.5		%		70-130	18-MAR-18
Titanium (Ti)-Dissolved			97.7		%		70-130	18-MAR-18
Uranium (U)-Dissolved			101.6		%		70-130	18-MAR-18
Vanadium (V)-Dissolved			95.1		%		70-130	18-MAR-18
Zinc (Zn)-Dissolved			88.2		%		70-130	18-MAR-18
NH3-L-F-CL	**Water**							
Batch R3986273								
WG2733507-10 LCS								
Ammonia as N			104.5		%		85-115	15-MAR-18
WG2733507-14 LCS								
Ammonia as N			102.0		%		85-115	15-MAR-18
WG2733507-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	15-MAR-18
WG2733507-9 MB								
Ammonia as N			<0.0050		mg/L		0.005	15-MAR-18
NO2-L-IC-N-CL	**Water**							
Batch R3983452								
WG2730911-10 LCS								
Nitrite (as N)			103.9		%		90-110	09-MAR-18
WG2730911-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	09-MAR-18
NO3-L-IC-N-CL	**Water**							
Batch R3983452								
WG2730911-10 LCS								
Nitrate (as N)			100.5		%		90-110	09-MAR-18
WG2730911-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	09-MAR-18
ORP-CL	**Water**							
Batch R3987011								
WG2733546-1 CRM		**CL-ORP**						
ORP			225		mV		210-230	15-MAR-18
P-T-L-COL-ED	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-ED	**Water**							
Batch R3986924								
WG2733859-10 LCS								
Phosphorus (P)-Total			97.6		%		80-120	16-MAR-18
WG2733859-12 LCS								
Phosphorus (P)-Total			99.0		%		80-120	16-MAR-18
WG2733859-2 LCS								
Phosphorus (P)-Total			98.2		%		80-120	16-MAR-18
WG2733859-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	16-MAR-18
WG2733859-11 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	16-MAR-18
WG2733859-9 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	16-MAR-18
PH-CL	**Water**							
Batch R3986687								
WG2733995-12 DUP		**L2065995-1**						
pH		8.12	8.13	J	pH	0.01	0.2	15-MAR-18
WG2733995-11 LCS								
pH			6.99		pH		6.9-7.1	15-MAR-18
PO4-DO-L-COL-ED	**Water**							
Batch R3981918								
WG2730245-10 LCS								
Orthophosphate-Dissolved (as P)			96.8		%		80-120	10-MAR-18
WG2730245-14 LCS								
Orthophosphate-Dissolved (as P)			97.0		%		80-120	10-MAR-18
WG2730245-2 LCS								
Orthophosphate-Dissolved (as P)			96.6		%		80-120	10-MAR-18
WG2730245-6 LCS								
Orthophosphate-Dissolved (as P)			98.0		%		80-120	10-MAR-18
WG2730245-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	10-MAR-18
WG2730245-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	10-MAR-18
WG2730245-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	10-MAR-18
WG2730245-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	10-MAR-18
SO4-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-CL	**Water**							
Batch R3983452								
WG2730911-10 LCS								
Sulfate (SO4)			100.5		%		90-110	09-MAR-18
WG2730911-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	09-MAR-18
SOLIDS-TDS-CL	**Water**							
Batch R3986120								
WG2732175-8 LCS								
Total Dissolved Solids			98.7		%		85-115	14-MAR-18
WG2732175-7 MB								
Total Dissolved Solids			<10		mg/L		10	14-MAR-18
TKN-L-F-CL	**Water**							
Batch R3986808								
WG2732288-10 LCS								
Total Kjeldahl Nitrogen			87.6		%		75-125	16-MAR-18
WG2732288-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	16-MAR-18
TSS-L-CL	**Water**							
Batch R3986882								
WG2733539-2 LCS								
Total Suspended Solids			88.0		%		85-115	15-MAR-18
WG2733539-1 MB								
Total Suspended Solids			<1.0		mg/L		1	15-MAR-18
TURBIDITY-CL	**Water**							
Batch R3982030								
WG2730413-5 LCS								
Turbidity			97.5		%		85-115	10-MAR-18
WG2730413-4 MB								
Turbidity			<0.10		NTU		0.1	10-MAR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	08-MAR-18 13:00	15-MAR-18 12:00	0.25	167	hours	EHTR-FM
	2	08-MAR-18 14:25	15-MAR-18 12:00	0.25	166	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2065995 were received on 09-MAR-18 08:55.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

995

COC ID:	20180308Q1GW	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Elkview Operations			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q1 Ground Water Sampling			Lab Contact	Lyudmyla Shvets			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cameron Griffin			Email	Lyundyla.Shvets@alsglobal.com			Email 2:	teckcoal@equitonline.com			X
Email	Cameron.Griffin@Teck.com			Address	2559 29 St NE,			Email 3:	James.Boldt@teck.com	X	X	X
Address	RR#1 HWY# 3							Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@hemsprint.tech.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO #	538700			
Postal Code	V1C 4C3	Country	Canada	Postal Code	T1Y 7H5	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	1 403 291 9897							

SAMPLE DETAILS								ANALYSIS REQUESTED											
FILTERED								No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
PRESERVED										Nitric	Sulphuric	Sulphuric			HCl	Sodium Bisulphate	Sodium Bisulphate	HCl	HCl
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	C=Grab C=Comp	# Of Cont.	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	TKN/TOC (APHA 4500-NORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	T-METHYL MERCURY	PAH, EPH (C10-C32)	EPH (C10-C32)	T-Mercury	D-Mercury
EV_MCgwS_WG_2018-03-08_NP	EV_MCgwS	WG	N	3/8/2018	13:00	G	5	1		1	1	1		1					
EV_MCgwD_WG_2018-03-08_NP	EV_MCgwD	WG	N	3/8/2018	14:25	G	5	1		1	1	1		1					
					Total		10												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Ultra-trace Mercury samples are unfiltered and unpreserved	Bryan Ogden	March 8, 2018		3/8/18
Total Methyl Mercury samples are preserved but unfiltered				
Total Selenium samples are preserved but unfiltered				
Dissolved Selenium samples are preserved and filtered				

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Bryan Ogden	Mobile #	250 425 3629
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 8, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

L2065995-COFC

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 03-MAY-18
Report Date: 11-MAY-18 14:10 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2088750

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180502Q2GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2088750-1	L2088750-2	L2088750-3		
	Description	WG	WG	WG		
	Sampled Date	02-MAY-18	02-MAY-18	02-MAY-18		
	Sampled Time	14:00	13:25	12:45		
	Client ID	EV_WH50GW_WG_2018-05_NP	EV_RCSGW_WG_2018-05_NP	EV_BRGW_WG_2018-05-02_NP		
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0		
	Conductivity (@ 25C) (uS/cm)	472	2330	1110		
	Hardness (as CaCO3) (mg/L)	259	1640	672		
	pH (pH)	8.45	8.46	8.32		
	ORP (mV)	314	369	313		
	Total Suspended Solids (mg/L)	3.2	1.2	1.2		
	Total Dissolved Solids (mg/L)	288 DLHC	2150 DLHC	808 DLHC		
	Turbidity (NTU)	4.27	0.11	0.32		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	143	247	222		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	8.4	24.6	5.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	151	271	227		
	Ammonia as N (mg/L)	0.0104	0.0083	0.0098		
	Bromide (Br) (mg/L)	<0.050	<0.25 DLHC	<0.25 DLHC		
	Chloride (Cl) (mg/L)	3.41	15.8 DLHC	31.1 DLHC		
	Fluoride (F) (mg/L)	0.147	0.20	0.18		
	Ion Balance (%)	105	96.6	102		
	Nitrate (as N) (mg/L)	1.29	37.6 DLHC	4.54 DLHC		
	Nitrite (as N) (mg/L)	0.0011	0.0158 DLHC	0.0458 DLHC		
	Total Kjeldahl Nitrogen (mg/L)	0.128	0.578	0.192		
	Total Nitrogen (mg/L)	1.42	38.2	4.78		
	Orthophosphate-Dissolved (as P) (mg/L)	0.0041 RRV	<0.0010	<0.0010		
	Phosphorus (P)-Total Dissolved (mg/L)	0.0073	<0.0010	0.0028		
	Sulfate (SO4) (mg/L)	90.6	1240 DLHC	379 DLHC		
	Anion Sum (meq/L)	5.10	34.4	13.6		
	Cation Sum (meq/L)	5.36	33.2	13.9		
	Cation - Anion Balance (%)	2.5	-1.7	1.0		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.05	1.68	0.76		
	Total Organic Carbon (mg/L)	1.08	1.69	0.74		
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030		
	Antimony (Sb)-Dissolved (mg/L)	0.00016	0.00043	<0.00010		
	Arsenic (As)-Dissolved (mg/L)	0.00010	<0.00020 DLA	<0.00010		
	Barium (Ba)-Dissolved (mg/L)	0.101	0.0411	0.0728		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2088750-1	L2088750-2	L2088750-3		
	Description	WG	WG	WG		
	Sampled Date	02-MAY-18	02-MAY-18	02-MAY-18		
	Sampled Time	14:00	13:25	12:45		
	Client ID	EV_WH50GW_WG_2018-05_NP	EV_RCSGW_WG_2018-05_NP	EV_BRGW_WG_2018-05-02_NP		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.040 DLA	<0.020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.00010 DLA	<0.000050		
	Boron (B)-Dissolved (mg/L)	0.010	<0.020 DLA	0.034		
	Cadmium (Cd)-Dissolved (ug/L)	0.0218	0.501	0.0540		
	Calcium (Ca)-Dissolved (mg/L)	64.0	355	172		
	Chromium (Cr)-Dissolved (mg/L)	0.00013	<0.00020 DLA	0.00010		
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.20 DLA	<0.10		
	Copper (Cu)-Dissolved (mg/L)	0.00502	0.575	<0.00050		
	Iron (Fe)-Dissolved (mg/L)	0.028	0.024	0.014		
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.00114	<0.000050		
	Lithium (Li)-Dissolved (mg/L)	0.0090	0.0674	0.0492		
	Magnesium (Mg)-Dissolved (mg/L)	24.1	183	58.9		
	Manganese (Mn)-Dissolved (mg/L)	0.00439	0.00824	0.00148		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.00116	0.00143	0.000622		
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.0163	0.00260		
	Potassium (K)-Dissolved (mg/L)	0.808	3.39	2.28		
	Selenium (Se)-Dissolved (ug/L)	11.0	229	21.4		
	Silicon (Si)-Dissolved (mg/L)	2.20	4.67	3.44		
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000020 DLA	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	3.71	7.06	9.86		
	Strontium (Sr)-Dissolved (mg/L)	0.149	0.421	0.361		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000020 DLA	<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	0.00112	0.00698	0.00158		
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.0010 DLA	<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	0.0081	0.943	0.0034		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Acidity (as CaCO3)	MB-LOR	L2088750-1, -2, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2088750-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2088750-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2088750-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2088750-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2088750-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

Reference Information

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL	Water	Total Nitrogen (Calculation)	APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-TD-L-COL-ED	Water	Total Dissolved P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorous is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C.

Reference Information

The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180502Q2GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4037712								
WG2767019-17 LCS								
Acidity (as CaCO3)			101.6		%		85-115	07-MAY-18
WG2767019-16 MB								
Acidity (as CaCO3)			2.0	MB-LOR	mg/L		2	07-MAY-18
ALK-MAN-CL	**Water**							
Batch R4034991								
WG2766181-18 DUP		**L2088750-1**						
Alkalinity, Total (as CaCO3)		151	157		mg/L	3.6	20	05-MAY-18
WG2766181-17 LCS								
Alkalinity, Total (as CaCO3)			101.5		%		85-115	05-MAY-18
WG2766181-16 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	05-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4039325								
WG2766816-2 LCS								
Beryllium (Be)-Dissolved			96.7		%		80-120	09-MAY-18
WG2766816-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	09-MAY-18
BR-L-IC-N-CL	**Water**							
Batch R4040094								
WG2769440-10 LCS								
Bromide (Br)			100.7		%		85-115	05-MAY-18
WG2769440-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	05-MAY-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4040089								
WG2769160-3 DUP		**L2088750-3**						
Dissolved Organic Carbon		0.76	0.87		mg/L	14	20	09-MAY-18
WG2769160-2 LCS								
Dissolved Organic Carbon			87.9		%		80-120	09-MAY-18
WG2769160-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	09-MAY-18
WG2769160-4 MS		**L2088750-3**						
Dissolved Organic Carbon			105.9		%		70-130	09-MAY-18
C-TOT-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4040089								
WG2769160-2 LCS								
Total Organic Carbon			88.2		%		80-120	09-MAY-18
WG2769160-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-MAY-18
CL-IC-N-CL	**Water**							
Batch R4040094								
WG2769440-10 LCS								
Chloride (Cl)			101.4		%		90-110	05-MAY-18
WG2769440-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	05-MAY-18
COLOUR-TRUE-CL	**Water**							
Batch R4033231								
WG2764312-2 LCS								
Colour, True			105.8		%		85-115	03-MAY-18
WG2764312-1 MB								
Colour, True			<5.0		CU		5	03-MAY-18
EC-L-PCT-CL	**Water**							
Batch R4034991								
WG2766181-18 DUP		**L2088750-1**						
Conductivity (@ 25C)		472	472		uS/cm	0.0	10	05-MAY-18
WG2766181-17 LCS								
Conductivity (@ 25C)			101.8		%		90-110	05-MAY-18
WG2766181-16 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	05-MAY-18
F-IC-N-CL	**Water**							
Batch R4040094								
WG2769440-10 LCS								
Fluoride (F)			105.4		%		90-110	05-MAY-18
WG2769440-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	05-MAY-18
HG-D-CVAA-VA	**Water**							
Batch R4038106								
WG2766899-7 DUP		**L2088750-2**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	08-MAY-18
WG2766899-6 LCS								
Mercury (Hg)-Dissolved			100.1		%		80-120	08-MAY-18
WG2766899-5 MB		**NP**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R4038106								
WG2766899-5 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	08-MAY-18
WG2766899-8 MS		**L2088750-1**						
Mercury (Hg)-Dissolved			89.1		%		70-130	08-MAY-18
MET-D-CCMS-VA	**Water**							
Batch R4039325								
WG2766816-2 LCS								
Aluminum (Al)-Dissolved			107.6		%		80-120	09-MAY-18
Antimony (Sb)-Dissolved			109.8		%		80-120	09-MAY-18
Arsenic (As)-Dissolved			102.6		%		80-120	09-MAY-18
Barium (Ba)-Dissolved			107.7		%		80-120	09-MAY-18
Bismuth (Bi)-Dissolved			96.3		%		80-120	09-MAY-18
Boron (B)-Dissolved			92.7		%		80-120	09-MAY-18
Cadmium (Cd)-Dissolved			106.2		%		80-120	09-MAY-18
Calcium (Ca)-Dissolved			98.4		%		80-120	09-MAY-18
Chromium (Cr)-Dissolved			105.5		%		80-120	09-MAY-18
Cobalt (Co)-Dissolved			105.6		%		80-120	09-MAY-18
Copper (Cu)-Dissolved			106.3		%		80-120	09-MAY-18
Iron (Fe)-Dissolved			102.2		%		80-120	09-MAY-18
Lead (Pb)-Dissolved			100.9		%		80-120	09-MAY-18
Lithium (Li)-Dissolved			98.5		%		80-120	09-MAY-18
Magnesium (Mg)-Dissolved			107.1		%		80-120	09-MAY-18
Manganese (Mn)-Dissolved			98.5		%		80-120	09-MAY-18
Molybdenum (Mo)-Dissolved			100.6		%		80-120	09-MAY-18
Nickel (Ni)-Dissolved			105.1		%		80-120	09-MAY-18
Potassium (K)-Dissolved			106.4		%		80-120	09-MAY-18
Selenium (Se)-Dissolved			104.9		%		80-120	09-MAY-18
Silicon (Si)-Dissolved			105.3		%		80-120	09-MAY-18
Silver (Ag)-Dissolved			110.7		%		80-120	09-MAY-18
Sodium (Na)-Dissolved			104.5		%		80-120	09-MAY-18
Strontium (Sr)-Dissolved			107.7		%		80-120	09-MAY-18
Thallium (Tl)-Dissolved			99.4		%		80-120	09-MAY-18
Tin (Sn)-Dissolved			105.5		%		80-120	09-MAY-18
Titanium (Ti)-Dissolved			97.4		%		80-120	09-MAY-18
Uranium (U)-Dissolved			92.8		%		80-120	09-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4039325								
WG2766816-2 LCS								
Vanadium (V)-Dissolved			109.8		%		80-120	09-MAY-18
Zinc (Zn)-Dissolved			99.6		%		80-120	09-MAY-18
WG2766816-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	09-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	09-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	09-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	09-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	09-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	09-MAY-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	09-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	09-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	09-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	09-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	09-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	09-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	09-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	09-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	09-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	09-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	09-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	09-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	09-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	09-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	09-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	09-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	09-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	09-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	09-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	09-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	09-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	09-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	09-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	09-MAY-18
NH3-L-F-CL	**Water**							

Quality Control Report

Workorder: L2088750 Report Date: 11-MAY-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-L-F-CL	**Water**							
Batch R4039840								
WG2769343-2 LCS								
Ammonia as N			105.2		%		85-115	10-MAY-18
WG2769343-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	10-MAY-18
NO2-L-IC-N-CL	**Water**							
Batch R4040094								
WG2769440-10 LCS								
Nitrite (as N)			106.7		%		90-110	05-MAY-18
WG2769440-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	05-MAY-18
NO3-L-IC-N-CL	**Water**							
Batch R4040094								
WG2769440-10 LCS								
Nitrate (as N)			101.4		%		90-110	05-MAY-18
WG2769440-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	05-MAY-18
ORP-CL	**Water**							
Batch R4040153								
WG2769057-7 CRM		**CL-ORP**						
ORP			217		mV		210-230	10-MAY-18
WG2769057-8 CRM		**CL-ORP**						
ORP			225		mV		210-230	10-MAY-18
P-TD-L-COL-ED	**Water**							
Batch R4040181								
WG2768998-2 LCS								
Phosphorus (P)-Total	Dissolved		107.8		%		80-120	10-MAY-18
WG2768998-1 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	10-MAY-18
PH-CL	**Water**							
Batch R4034991								
WG2766181-18 DUP		**L2088750-1**						
pH		8.45	8.48	J	pH	0.03	0.2	05-MAY-18
WG2766181-17 LCS								
pH			7.07		pH		6.9-7.1	05-MAY-18
PO4-DO-L-COL-ED	**Water**							

Quality Control Report

Workorder: L2088750 Report Date: 11-MAY-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-L-COL-ED	**Water**							
Batch R4033561								
WG2764950-10 LCS								
Orthophosphate-Dissolved (as P)			96.0		%		80-120	04-MAY-18
WG2764950-14 LCS								
Orthophosphate-Dissolved (as P)			97.4		%		80-120	04-MAY-18
WG2764950-2 LCS								
Orthophosphate-Dissolved (as P)			95.2		%		80-120	04-MAY-18
WG2764950-6 LCS								
Orthophosphate-Dissolved (as P)			97.4		%		80-120	04-MAY-18
WG2764950-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	04-MAY-18
WG2764950-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	04-MAY-18
WG2764950-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	04-MAY-18
WG2764950-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	04-MAY-18
SO4-IC-N-CL	**Water**							
Batch R4040094								
WG2769440-10 LCS								
Sulfate (SO4)			102.5		%		90-110	05-MAY-18
WG2769440-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	05-MAY-18
SOLIDS-TDS-CL	**Water**							
Batch R4039069								
WG2766922-15 DUP		**L2088750-3**						
Total Dissolved Solids		808	814		mg/L	0.8	20	08-MAY-18
WG2766922-11 LCS								
Total Dissolved Solids			97.4		%		85-115	08-MAY-18
WG2766922-14 LCS								
Total Dissolved Solids			94.2		%		85-115	08-MAY-18
WG2766922-10 MB								
Total Dissolved Solids			<10		mg/L		10	08-MAY-18
WG2766922-13 MB								
Total Dissolved Solids			<10		mg/L		10	08-MAY-18
TKN-L-F-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-L-F-CL	**Water**							
Batch R4038807								
WG2768323-14 LCS								
Total Kjeldahl Nitrogen			94.3		%		75-125	09-MAY-18
WG2768323-13 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	09-MAY-18
TSS-L-CL	**Water**							
Batch R4039086								
WG2767683-8 LCS								
Total Suspended Solids			93.3		%		85-115	08-MAY-18
WG2767683-7 MB								
Total Suspended Solids			<1.0		mg/L		1	08-MAY-18
TURBIDITY-CL	**Water**							
Batch R4033867								
WG2764965-2 LCS								
Turbidity			99.5		%		85-115	04-MAY-18
WG2764965-5 LCS								
Turbidity			99.0		%		85-115	04-MAY-18
WG2764965-1 MB								
Turbidity			<0.10		NTU		0.1	04-MAY-18
WG2764965-4 MB								
Turbidity			<0.10		NTU		0.1	04-MAY-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	02-MAY-18 14:00	05-MAY-18 09:00	0.25	67	hours	EHTR-FM
	2	02-MAY-18 13:25	05-MAY-18 09:00	0.25	68	hours	EHTR-FM
	3	02-MAY-18 12:45	05-MAY-18 09:00	0.25	68	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2088750 were received on 03-MAY-18 08:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2088750-COFC

COC ID: 20180502Q2GW

TURNAROUND TIME:

PROJECT/CLIENT INFO				LAB			
Facility Name / Job#	Elkview Operations			Lab Name	ALS Calgary		
Job Description	Q2 Ground Water Sampling			Lab Contact	Lyudmyla Shvets		
Project Manager	Cameron Griffin			Email	Lyudmyla.Shvets@a		
Email	Cameron.Griffin@Teck.com			Address	2559 29 St NE,		
Address	RR#1 HWY# 3						
City	Sparwood	Province	BC	City	Calgary	Province	AB
Postal Code	V1C 4C3	Country	Canada	Postal Code	T1Y 7B5	Country	Canada
Phone Number	1-250-865-5289			Phone Number	1 403 291 9897		

Report Format / Distribution	Excel	PDF	EDD
Email 1:	X	X	X
Email 2:			X
Email 3:	X	X	X
Email 4:	Cameron.Griffin@teck.com	X	X
Email 5:	Teck.Lab.Results@interpoint.teck.com	X	X
PO #	538700		

SAMPLE DETAILS / ANALYSIS REQUESTED

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTERED	PRESERVED	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorous	N-T-Calculation For BC	D-ULTRA MERCURY (SW6020)	T-METHYL MERCURY	PAH, EPH (C10-C32)	EPH (C10-C32)	TKN/TOC (APHA 4500-NORG)	D-Mercury
											No	No	Yes	Yes			No	No	No	No	No	Yes
													Nitrate	Sulphuric				HCl	Sodium Bicarbonate	Sodium Bicarbonate	Sulphuric	HCl
1	EV_WI150gw_WG_2018-05_NP	EV_WI150gw	WG	N	5/2/2018	14:00	G	5			1		1	1		1					1	1
2	EV_RCSgw_WG_2018-05_NP	EV_RCSgw	WG	N	5/2/2018	13:25	G	5			1		1	1		1					1	1
3	EV_HRgw_WG_2018-05-02_NP	EV_HRgw	WG	N	5/2/2018	12:45	G	5			1		1	1		1					1	1
						Total		15														

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Ultra-trace Mercury samples are unfiltered and unpreserved	Bryan Ogden	May 2, 2018		
Total Methyl Mercury samples are preserved but unfiltered				
Total Selenium samples are preserved but unfiltered				
Dissolved Selenium samples are preserved and filtered				

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Bryan Ogden	Mobile #	250 425 3629
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	May 2, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 10-MAY-18
Report Date: 18-MAY-18 19:41 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2092752

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180509Q2GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2092752-1				
	Description	WG				
	Sampled Date	09-MAY-18				
	Sampled Time	14:00				
	Client ID	EV_BCGW_WG_2018-05_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0				
	Conductivity (@ 25C) (uS/cm)	990				
	Hardness (as CaCO3) (mg/L)	546				
	pH (pH)	8.24				
	ORP (mV)	347				
	Total Suspended Solids (mg/L)	7.7				
	Total Dissolved Solids (mg/L)	740 DLHC				
	Turbidity (NTU)	2.18				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	204				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	204				
	Ammonia as N (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	9.14				
	Fluoride (F) (mg/L)	0.154				
	Ion Balance (%)	103				
	Nitrate (as N) (mg/L)	7.46				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.439 TKNI				
	Total Nitrogen (mg/L)	7.90				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0041				
	Phosphorus (P)-Total Dissolved (mg/L)	0.0042 RRV				
	Phosphorus (P)-Total (mg/L)	0.0108 RRV				
	Sulfate (SO4) (mg/L)	289				
	Anion Sum (meq/L)	10.9				
	Cation Sum (meq/L)	11.2				
	Cation - Anion Balance (%)	1.4				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.07				
	Total Organic Carbon (mg/L)	1.06				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	0.00013				
	Arsenic (As)-Dissolved (mg/L)	0.00015				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2092752-1				
	Description	WG				
	Sampled Date	09-MAY-18				
	Sampled Time	14:00				
	Client ID	EV_BCGW_WG_2018-05_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Barium (Ba)-Dissolved (mg/L)	0.0449				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.015				
	Cadmium (Cd)-Dissolved (ug/L)	0.0504				
	Calcium (Ca)-Dissolved (mg/L)	131				
	Chromium (Cr)-Dissolved (mg/L)	0.00018				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00091				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0317				
	Magnesium (Mg)-Dissolved (mg/L)	53.0				
	Manganese (Mn)-Dissolved (mg/L)	<0.00010				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000943				
	Nickel (Ni)-Dissolved (mg/L)	0.00074				
	Potassium (K)-Dissolved (mg/L)	1.32				
	Selenium (Se)-Dissolved (ug/L)	39.0				
	Silicon (Si)-Dissolved (mg/L)	3.01				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	5.60				
	Strontium (Sr)-Dissolved (mg/L)	0.232				
	Thallium (Tl)-Dissolved (mg/L)	0.000015				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00169				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0021				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2092752-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2092752-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2092752-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2092752-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2092752-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Reference Information

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-ED Water Total Dissolved P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorous is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180509Q2GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4047034								
WG2774591-15 DUP		**L2092752-1**						
Acidity (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	16-MAY-18
WG2774591-14 LCS								
Acidity (as CaCO3)			103.1		%		85-115	16-MAY-18
WG2774591-13 MB								
Acidity (as CaCO3)			1.9		mg/L		2	16-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4047138								
WG2772208-2 LCS								
Beryllium (Be)-Dissolved			97.6		%		80-120	17-MAY-18
WG2772208-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	17-MAY-18
BR-L-IC-N-CL	**Water**							
Batch R4041541								
WG2771267-2 LCS								
Bromide (Br)			97.8		%		85-115	12-MAY-18
WG2771267-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	12-MAY-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4047057								
WG2774776-2 LCS								
Dissolved Organic Carbon			83.4		%		80-120	16-MAY-18
WG2774776-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	16-MAY-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4047057								
WG2774776-2 LCS								
Total Organic Carbon			89.4		%		80-120	16-MAY-18
WG2774776-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	16-MAY-18
CL-IC-N-CL	**Water**							
Batch R4041541								
WG2771267-2 LCS								
Chloride (Cl)			98.2		%		90-110	12-MAY-18
WG2771267-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	12-MAY-18
COLOUR-TRUE-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COLOUR-TRUE-CL	**Water**							
Batch R4041196								
WG2770177-3 DUP		**L2092752-1**						
Colour, True		<5.0	<5.0	RPD-NA	CU	N/A	20	11-MAY-18
WG2770177-2 LCS								
Colour, True			104.4		%		85-115	11-MAY-18
WG2770177-1 MB								
Colour, True			<5.0		CU		5	11-MAY-18
F-IC-N-CL	**Water**							
Batch R4041541								
WG2771267-2 LCS								
Fluoride (F)			103.6		%		90-110	12-MAY-18
WG2771267-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	12-MAY-18
HG-D-CVAA-VA	**Water**							
Batch R4044430								
WG2772402-2 LCS								
Mercury (Hg)-Dissolved			99.97		%		80-120	15-MAY-18
Batch R4046063								
WG2772402-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005		mg/L		0.000005	16-MAY-18
WG2772402-4 MS		**L2092752-1**						
Mercury (Hg)-Dissolved			98.3		%		70-130	16-MAY-18
MET-D-CCMS-VA	**Water**							
Batch R4047138								
WG2772208-2 LCS								
Aluminum (Al)-Dissolved			101.2		%		80-120	17-MAY-18
Antimony (Sb)-Dissolved			94.2		%		80-120	17-MAY-18
Arsenic (As)-Dissolved			99.7		%		80-120	17-MAY-18
Barium (Ba)-Dissolved			99.7		%		80-120	17-MAY-18
Bismuth (Bi)-Dissolved			95.6		%		80-120	17-MAY-18
Boron (B)-Dissolved			89.2		%		80-120	17-MAY-18
Cadmium (Cd)-Dissolved			98.5		%		80-120	17-MAY-18
Calcium (Ca)-Dissolved			97.9		%		80-120	17-MAY-18
Chromium (Cr)-Dissolved			91.8		%		80-120	17-MAY-18
Cobalt (Co)-Dissolved			98.4		%		80-120	17-MAY-18
Copper (Cu)-Dissolved			96.5		%		80-120	17-MAY-18
Iron (Fe)-Dissolved			96.3		%		80-120	17-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4047138								
WG2772208-2 LCS								
Lead (Pb)-Dissolved			96.6		%		80-120	17-MAY-18
Lithium (Li)-Dissolved			92.6		%		80-120	17-MAY-18
Magnesium (Mg)-Dissolved			99.6		%		80-120	17-MAY-18
Manganese (Mn)-Dissolved			99.7		%		80-120	17-MAY-18
Molybdenum (Mo)-Dissolved			95.6		%		80-120	17-MAY-18
Nickel (Ni)-Dissolved			98.8		%		80-120	17-MAY-18
Potassium (K)-Dissolved			101.1		%		80-120	17-MAY-18
Selenium (Se)-Dissolved			96.5		%		80-120	17-MAY-18
Silicon (Si)-Dissolved			98.5		%		80-120	17-MAY-18
Silver (Ag)-Dissolved			95.8		%		80-120	17-MAY-18
Sodium (Na)-Dissolved			104.6		%		80-120	17-MAY-18
Strontium (Sr)-Dissolved			93.9		%		80-120	17-MAY-18
Thallium (Tl)-Dissolved			97.0		%		80-120	17-MAY-18
Tin (Sn)-Dissolved			94.6		%		80-120	17-MAY-18
Titanium (Ti)-Dissolved			90.7		%		80-120	17-MAY-18
Uranium (U)-Dissolved			97.1		%		80-120	17-MAY-18
Vanadium (V)-Dissolved			100.5		%		80-120	17-MAY-18
Zinc (Zn)-Dissolved			94.7		%		80-120	17-MAY-18
WG2772208-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	17-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	17-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	17-MAY-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	17-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	17-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	17-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	17-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	17-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	17-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	17-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4047138								
WG2772208-1 MB		**NP**						
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	17-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	17-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	17-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	17-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	17-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	17-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	17-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	17-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	17-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	17-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	17-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	17-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	17-MAY-18
NH3-L-F-CL	**Water**							
Batch R4046049								
WG2773952-16 LCS								
Ammonia as N			104.4		%		85-115	16-MAY-18
WG2773952-15 MB								
Ammonia as N			<0.0050		mg/L		0.005	16-MAY-18
NO2-L-IC-N-CL	**Water**							
Batch R4041541								
WG2771267-2 LCS								
Nitrite (as N)			102.3		%		90-110	12-MAY-18
WG2771267-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	12-MAY-18
NO3-L-IC-N-CL	**Water**							
Batch R4041541								
WG2771267-2 LCS								
Nitrate (as N)			98.1		%		90-110	12-MAY-18
WG2771267-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	12-MAY-18
ORP-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ORP-CL	**Water**							
Batch R4047112								
WG2775297-4 CRM		**CL-ORP**						
ORP			223		mV		210-230	17-MAY-18
WG2775297-5 CRM		**CL-ORP**						
ORP			222		mV		210-230	17-MAY-18
P-T-L-COL-ED	**Water**							
Batch R4048091								
WG2775861-11 DUP		**L2092752-1**						
Phosphorus (P)-Total		0.0108	0.0105		mg/L	2.8	20	18-MAY-18
WG2775861-14 LCS								
Phosphorus (P)-Total			102.4		%		80-120	18-MAY-18
WG2775861-16 LCS								
Phosphorus (P)-Total			100.4		%		80-120	18-MAY-18
WG2775861-18 LCS								
Phosphorus (P)-Total			100.6		%		80-120	18-MAY-18
WG2775861-2 LCS								
Phosphorus (P)-Total			107.0		%		80-120	18-MAY-18
WG2775861-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	18-MAY-18
WG2775861-13 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	18-MAY-18
WG2775861-15 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	18-MAY-18
WG2775861-17 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	18-MAY-18
WG2775861-12 MS		**L2092752-1**						
Phosphorus (P)-Total			105.4		%		70-130	18-MAY-18
P-TD-L-COL-ED	**Water**							
Batch R4048091								
WG2775861-11 DUP		**L2092752-1**						
Phosphorus (P)-Total	Dissolved	0.0042	0.0040		mg/L	4.9	20	18-MAY-18
WG2775861-2 LCS								
Phosphorus (P)-Total	Dissolved		107.0		%		80-120	18-MAY-18
WG2775861-1 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	18-MAY-18
WG2775861-12 MS		**L2092752-1**						
Phosphorus (P)-Total	Dissolved		99.7		%		70-130	18-MAY-18
PO4-DO-L-COL-ED	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-L-COL-ED	**Water**							
Batch R4041338								
WG2770922-10 LCS								
Orthophosphate-Dissolved (as P)			98.8		%		80-120	12-MAY-18
WG2770922-14 LCS								
Orthophosphate-Dissolved (as P)			98.8		%		80-120	12-MAY-18
WG2770922-2 LCS								
Orthophosphate-Dissolved (as P)			99.6		%		80-120	12-MAY-18
WG2770922-6 LCS								
Orthophosphate-Dissolved (as P)			97.2		%		80-120	12-MAY-18
WG2770922-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	12-MAY-18
WG2770922-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	12-MAY-18
WG2770922-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	12-MAY-18
WG2770922-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	12-MAY-18
SO4-IC-N-CL	**Water**							
Batch R4041541								
WG2771267-2 LCS								
Sulfate (SO4)			97.7		%		90-110	12-MAY-18
WG2771267-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	12-MAY-18
SOLIDS-TDS-CL	**Water**							
Batch R4045893								
WG2772489-8 LCS								
Total Dissolved Solids			97.1		%		85-115	15-MAY-18
WG2772489-7 MB								
Total Dissolved Solids			<10		mg/L		10	15-MAY-18
TKN-L-F-CL	**Water**							
Batch R4046709								
WG2774823-8 LCS								
Total Kjeldahl Nitrogen			99.6		%		75-125	16-MAY-18
WG2774823-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	16-MAY-18
TSS-L-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-L-CL	**Water**							
Batch R4045879								
WG2773166-8 LCS								
Total Suspended Solids			95.3		%		85-115	15-MAY-18
WG2773166-7 MB								
Total Suspended Solids			<1.0		mg/L		1	15-MAY-18
TURBIDITY-CL	**Water**							
Batch R4041282								
WG2770444-11 LCS								
Turbidity			99.5		%		85-115	11-MAY-18
WG2770444-10 MB								
Turbidity			<0.10		NTU		0.1	11-MAY-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	09-MAY-18 14:00	15-MAY-18 13:00	0.25	143	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2092752 were received on 10-MAY-18 09:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 20180509Q2GW

TURNAROUND TIME:

L2092752-COFC

PROJECT/CLIENT INFO	
Facility Name / Job#	Elkview Operations
Job Description	Q2 Ground Water Sampling
Project Manager	Cameron Griffin
Email	Cameron.Griffin@Teck.com
Address	RR#1 HWY# 3
City	Sparwood
Province	BC
Postal Code	V1C 4C3
Country	Canada
Phone Number	1-250-865-5289

LABORATORY	
Lab Name	ALS Calgary
Lab Contact	Lyudmyla Shvets
Email	Lyundyla.Shvets@alsglobal.com
Address	2559 29 St NE,
City	Calgary
Province	AB
Postal Code	T1Y 7B5
Country	Canada
Phone Number	1 403 291 9897

				EDD
				X
				X
				X
Email 4:	Cameron.Griffin@teck.com	X	X	X
Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
PO #	538700			

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphurous	N-T-Calculation For BC	D-ULTRA MERCURY (SW6020)	T-METHYL MERCURY	PAH, EPH (C10-C32)	EPH (C10-C32)	TKN/TOC (APHA 4500-NORG)	D-Mercury
FILTERED								No	No	Yes	Yes			No	No	No	No	No	Yes
PRESERVED										Nitric	Sulphuric				HCl	Sodium Bisulphate	Sodium Bisulphate	Sulphuric	HCl
EV_BCgw_WG_2018-05_NP	EV_BCgw	WG	N	5/9/2018	14:00	G	5	1		1	1		1					1	1
						Total	5												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Ultra-trace Mercury samples are unfiltered and unpreserved Total Methyl Mercury samples are preserved but unfiltered Total Selenium samples are preserved but unfiltered Dissolved Selenium samples are preserved and filtered	Bryan Ogden	May 9, 2018	[signature]	5/10 9:30

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Bryan Ogden	Mobile #	250 425 3629
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	[signature]	Date/Time	May 9, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

4.0

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 11-MAY-18
Report Date: 24-MAY-18 12:39 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2093281

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180510Q2GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2093281-1 WG 10-MAY-18 11:45 EV_MCGWS_WG_2018-05_NP	L2093281-2 WG 10-MAY-18 13:10 EV_MCGWD_WG_2018-05_NP	L2093281-3 WG 10-MAY-18 15:10 EV_LSGW_WG_2018-05_NP	L2093281-4 WG 10-MAY-18 09:15 EV_ECGW_WG_2018-05_NP	
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	
	Conductivity (@ 25C) (uS/cm)	819	595	951	394	
	Hardness (as CaCO3) (mg/L)	391	243	563	157	
	pH (pH)	7.98	8.40	8.36	8.36	
	ORP (mV)	328	233	247	265	
	Total Suspended Solids (mg/L)	6.7	599 DLHC	6.7	233 DLHC	
	Total Dissolved Solids (mg/L)	516 DLHC	377 DLHC	577 DLHC	261 DLHC	
	Turbidity (NTU)	29.5	410	22.1	179	
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	6.0	<1.0	8.6	<1.0	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	266	245	493	188	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	13.6	18.2	5.8	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	266	259	512	194	
	Ammonia as N (mg/L)	0.143	0.126	0.157	0.111	
	Bromide (Br) (mg/L)	0.158	<0.050	0.050	<0.050	
	Chloride (Cl) (mg/L)	38.4	3.24	8.00	0.57	
	Fluoride (F) (mg/L)	0.385	1.13	0.251	0.840	
	Ion Balance (%)	103	94.7	98.0	94.2	
	Nitrate (as N) (mg/L)	<0.0050	0.0671	<0.0050	0.147	
	Nitrite (as N) (mg/L)	0.0016	0.0054	0.0013	0.0101	
	Total Kjeldahl Nitrogen (mg/L)	0.316	0.634	0.315	0.314	
	Total Nitrogen (mg/L)	0.318	0.707	0.316	0.471	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	0.0092	<0.0010	0.0130	
	Phosphorus (P)-Total Dissolved (mg/L)	0.0022	0.0093	0.0298	0.0174	
	Phosphorus (P)-Total (mg/L)	0.0039	0.583 DLHC	0.0431	0.189 DLHC	
	Sulfate (SO4) (mg/L)	134	85.1	78.1	24.9	
	Anion Sum (meq/L)	9.21	7.09	12.1	4.47	
	Cation Sum (meq/L)	9.45	6.72	11.8	4.21	
	Cation - Anion Balance (%)	1.3	-2.7	-1.0	-3.0	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.30	1.32	3.39	0.85	
	Total Organic Carbon (mg/L)	1.24	<2.5 DLM	3.20	<2.5 DLM	
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	0.00016	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	0.00150	0.00055	0.00147	0.00032	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2093281-1	L2093281-2	L2093281-3	L2093281-4	
Description	WG	WG	WG	WG	
Sampled Date	10-MAY-18	10-MAY-18	10-MAY-18	10-MAY-18	
Sampled Time	11:45	13:10	15:10	09:15	
Client ID	EV_MCGWS_WG_2018-05_NP	EV_MCGWD_WG_2018-05_NP	EV_LSGW_WG_2018-05_NP	EV_ECGW_WG_2018-05_NP	
Grouping / **Analyte**					
WATER					
Dissolved Metals					
Barium (Ba)-Dissolved (mg/L)	0.0258	0.0702	0.151	0.0494	
Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)-Dissolved (mg/L)	0.025	0.068	0.038	0.103	
Cadmium (Cd)-Dissolved (ug/L)	<0.0050	0.0434	0.0062	0.0365	
Calcium (Ca)-Dissolved (mg/L)	100	53.7	107	36.0	
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Cobalt (Co)-Dissolved (ug/L)	0.12	0.41	0.88	0.24	
Copper (Cu)-Dissolved (mg/L)	0.00071	0.00183	<0.00050	0.00472	
Iron (Fe)-Dissolved (mg/L)	2.09	<0.010	1.87	<0.010	
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium (Li)-Dissolved (mg/L)	0.0254	0.0103	0.0649	0.0117	
Magnesium (Mg)-Dissolved (mg/L)	34.0	26.3	72.2	16.4	
Manganese (Mn)-Dissolved (mg/L)	0.124	0.303	1.02	0.146	
Mercury (Hg)-Dissolved (mg/L)			<0.0000050	<0.0000050	
Mercury (Hg)-Dissolved (ug/L)	<0.00050	<0.00050			
Molybdenum (Mo)-Dissolved (mg/L)	0.00345	0.0165	0.00281	0.0141	
Nickel (Ni)-Dissolved (mg/L)	0.00091	0.00675	0.00396	0.00130	
Potassium (K)-Dissolved (mg/L)	1.68	1.51	3.49	0.935	
Selenium (Se)-Dissolved (ug/L)	<0.050	0.263	0.075	0.089	
Silicon (Si)-Dissolved (mg/L)	4.83	4.89	3.90	4.35	
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Dissolved (mg/L)	33.9	41.7	8.36	23.9	
Strontium (Sr)-Dissolved (mg/L)	0.290	0.486	0.463	0.425	
Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000075	0.000032	0.000021	
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00037	
Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Uranium (U)-Dissolved (mg/L)	0.00218	0.00373	0.00226	0.00125	
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc (Zn)-Dissolved (mg/L)	0.0057	0.0053	0.0019	0.0090	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Aluminum (Al)-Dissolved	MB-LOR	L2093281-1, -2
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2093281-3, -4
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2093281-1, -2
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2093281-3, -4
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2093281-1, -2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2093281-3, -4
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2093281-1, -2
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2093281-1, -2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2093281-3, -4
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2093281-1, -2
Matrix Spike	Ammonia as N	MS-B	L2093281-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-D-U-CVAF-VA	Water	Diss. Mercury in Water by CVAFS (Ultra)	APHA 3030 B / EPA 1631 REV. E

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure may involve preliminary sample treatment by filtration (APHA 3030B) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL	Water	Total Nitrogen (Calculation)	APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-ED	Water	Total Dissolved P in Water by Colour	APHA 4500-P PHOSPHORUS

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorous is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180510Q2GW

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4047034								
WG2774591-17 LCS								
Acidity (as CaCO3)			104.5		%		85-115	16-MAY-18
WG2774591-20 LCS								
Acidity (as CaCO3)			105.0		%		85-115	16-MAY-18
WG2774591-16 MB								
Acidity (as CaCO3)			1.5		mg/L		2	16-MAY-18
WG2774591-19 MB								
Acidity (as CaCO3)			2.0		mg/L		2	16-MAY-18
ALK-MAN-CL	**Water**							
Batch R4047087								
WG2775270-29 LCS								
Alkalinity, Total (as CaCO3)			101.2		%		85-115	17-MAY-18
WG2775270-28 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	17-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4047067								
WG2772590-14 LCS								
Beryllium (Be)-Dissolved			97.4		%		80-120	17-MAY-18
WG2772590-13 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	17-MAY-18
Batch R4048907								
WG2773267-2 LCS								
Beryllium (Be)-Dissolved			99.3		%		80-120	19-MAY-18
WG2773267-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	19-MAY-18
BR-L-IC-N-CL	**Water**							
Batch R4046057								
WG2773990-11 DUP		**L2093281-4**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	13-MAY-18
WG2773990-10 LCS								
Bromide (Br)			99.1		%		85-115	13-MAY-18
WG2773990-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	13-MAY-18
WG2773990-12 MS		**L2093281-4**						
Bromide (Br)			95.2		%		75-125	13-MAY-18
C-DIS-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R4048192								
WG2776555-3 DUP		**L2093281-3**						
Dissolved Organic Carbon		3.39	3.66		mg/L	7.7	20	18-MAY-18
WG2776555-2 LCS								
Dissolved Organic Carbon			101.8		%		80-120	18-MAY-18
WG2776555-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	18-MAY-18
WG2776555-4 MS		**L2093281-3**						
Dissolved Organic Carbon			97.9		%		70-130	18-MAY-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4048192								
WG2776555-3 DUP		**L2093281-3**						
Total Organic Carbon		3.20	2.95		mg/L	8.1	20	18-MAY-18
WG2776555-2 LCS								
Total Organic Carbon			103.1		%		80-120	18-MAY-18
WG2776555-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	18-MAY-18
WG2776555-4 MS		**L2093281-3**						
Total Organic Carbon			112.1		%		70-130	18-MAY-18
CL-IC-N-CL	**Water**							
Batch R4046057								
WG2773990-11 DUP		**L2093281-4**						
Chloride (Cl)		0.57	0.58		mg/L	0.2	20	13-MAY-18
WG2773990-10 LCS								
Chloride (Cl)			102.4		%		90-110	13-MAY-18
WG2773990-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	13-MAY-18
WG2773990-12 MS		**L2093281-4**						
Chloride (Cl)			91.7		%		75-125	13-MAY-18
COLOUR-TRUE-CL	**Water**							
Batch R4041196								
WG2770177-2 LCS								
Colour, True			104.4		%		85-115	11-MAY-18
WG2770177-1 MB								
Colour, True			<5.0		CU		5	11-MAY-18
EC-L-PCT-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-L-PCT-CL	**Water**							
Batch R4047087								
WG2775270-29 LCS								
Conductivity (@ 25C)			109.1		%		90-110	17-MAY-18
WG2775270-28 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	17-MAY-18
F-IC-N-CL	**Water**							
Batch R4046057								
WG2773990-11 DUP		**L2093281-4**						
Fluoride (F)		0.840	0.826		mg/L	1.6	20	13-MAY-18
WG2773990-10 LCS								
Fluoride (F)			105.0		%		90-110	13-MAY-18
WG2773990-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	13-MAY-18
WG2773990-12 MS		**L2093281-4**						
Fluoride (F)			90.0		%		75-125	13-MAY-18
HG-D-CVAA-VA	**Water**							
Batch R4044430								
WG2772402-10 LCS								
Mercury (Hg)-Dissolved			99.7		%		80-120	15-MAY-18
Batch R4046063								
WG2772402-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	16-MAY-18
HG-D-U-CVAF-VA	**Water**							
Batch R4051130								
WG2776680-2 LCS								
Mercury (Hg)-Dissolved			100.6		%		80-120	22-MAY-18
WG2776680-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.00050		ug/L		0.0005	22-MAY-18
MET-D-CCMS-VA	**Water**							
Batch R4047067								
WG2772590-14 LCS								
Aluminum (Al)-Dissolved			99.4		%		80-120	17-MAY-18
Antimony (Sb)-Dissolved			94.5		%		80-120	17-MAY-18
Arsenic (As)-Dissolved			96.3		%		80-120	17-MAY-18
Barium (Ba)-Dissolved			95.7		%		80-120	17-MAY-18
Bismuth (Bi)-Dissolved			101.8		%		80-120	17-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4047067								
WG2772590-14 LCS								
Boron (B)-Dissolved			92.1		%		80-120	17-MAY-18
Cadmium (Cd)-Dissolved			92.3		%		80-120	17-MAY-18
Calcium (Ca)-Dissolved			98.1		%		80-120	17-MAY-18
Chromium (Cr)-Dissolved			98.3		%		80-120	17-MAY-18
Cobalt (Co)-Dissolved			96.6		%		80-120	17-MAY-18
Copper (Cu)-Dissolved			96.2		%		80-120	17-MAY-18
Iron (Fe)-Dissolved			94.5		%		80-120	17-MAY-18
Lead (Pb)-Dissolved			96.4		%		80-120	17-MAY-18
Lithium (Li)-Dissolved			103.7		%		80-120	17-MAY-18
Magnesium (Mg)-Dissolved			102.8		%		80-120	17-MAY-18
Manganese (Mn)-Dissolved			95.1		%		80-120	17-MAY-18
Molybdenum (Mo)-Dissolved			94.1		%		80-120	17-MAY-18
Nickel (Ni)-Dissolved			95.4		%		80-120	17-MAY-18
Potassium (K)-Dissolved			99.2		%		80-120	17-MAY-18
Selenium (Se)-Dissolved			95.8		%		80-120	17-MAY-18
Silicon (Si)-Dissolved			95.6		%		80-120	17-MAY-18
Silver (Ag)-Dissolved			92.8		%		80-120	17-MAY-18
Sodium (Na)-Dissolved			92.8		%		80-120	17-MAY-18
Strontium (Sr)-Dissolved			97.0		%		80-120	17-MAY-18
Thallium (Tl)-Dissolved			94.9		%		80-120	17-MAY-18
Tin (Sn)-Dissolved			93.3		%		80-120	17-MAY-18
Titanium (Ti)-Dissolved			93.3		%		80-120	17-MAY-18
Uranium (U)-Dissolved			101.9		%		80-120	17-MAY-18
Vanadium (V)-Dissolved			98.3		%		80-120	17-MAY-18
Zinc (Zn)-Dissolved			97.7		%		80-120	17-MAY-18
WG2772590-13 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	17-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	17-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	17-MAY-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	17-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	17-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4047067								
WG2772590-13 MB		**NP**						
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	17-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	17-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	17-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	17-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	17-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	17-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	17-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	17-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	17-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	17-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	17-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	17-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	17-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	17-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	17-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	17-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	17-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	17-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	17-MAY-18
Batch R4048907								
WG2773267-2 LCS								
Aluminum (Al)-Dissolved			99.3		%		80-120	19-MAY-18
Antimony (Sb)-Dissolved			96.9		%		80-120	19-MAY-18
Arsenic (As)-Dissolved			101.2		%		80-120	19-MAY-18
Barium (Ba)-Dissolved			101.3		%		80-120	19-MAY-18
Bismuth (Bi)-Dissolved			98.5		%		80-120	19-MAY-18
Boron (B)-Dissolved			97.4		%		80-120	19-MAY-18
Cadmium (Cd)-Dissolved			101.0		%		80-120	19-MAY-18
Calcium (Ca)-Dissolved			101.3		%		80-120	19-MAY-18
Chromium (Cr)-Dissolved			99.0		%		80-120	19-MAY-18
Cobalt (Co)-Dissolved			99.5		%		80-120	19-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4048907								
WG2773267-2 LCS								
Copper (Cu)-Dissolved			99.0		%		80-120	19-MAY-18
Iron (Fe)-Dissolved			100.7		%		80-120	19-MAY-18
Lead (Pb)-Dissolved			101.2		%		80-120	19-MAY-18
Lithium (Li)-Dissolved			96.7		%		80-120	19-MAY-18
Magnesium (Mg)-Dissolved			101.2		%		80-120	19-MAY-18
Manganese (Mn)-Dissolved			104.1		%		80-120	19-MAY-18
Molybdenum (Mo)-Dissolved			96.2		%		80-120	19-MAY-18
Nickel (Ni)-Dissolved			101.0		%		80-120	19-MAY-18
Potassium (K)-Dissolved			102.6		%		80-120	19-MAY-18
Selenium (Se)-Dissolved			99.7		%		80-120	19-MAY-18
Silicon (Si)-Dissolved			102.0		%		80-120	19-MAY-18
Silver (Ag)-Dissolved			94.2		%		80-120	19-MAY-18
Sodium (Na)-Dissolved			103.8		%		80-120	19-MAY-18
Strontium (Sr)-Dissolved			98.7		%		80-120	19-MAY-18
Thallium (Tl)-Dissolved			100.0		%		80-120	19-MAY-18
Tin (Sn)-Dissolved			97.3		%		80-120	19-MAY-18
Titanium (Ti)-Dissolved			99.7		%		80-120	19-MAY-18
Uranium (U)-Dissolved			101.8		%		80-120	19-MAY-18
Vanadium (V)-Dissolved			100.1		%		80-120	19-MAY-18
Zinc (Zn)-Dissolved			92.7		%		80-120	19-MAY-18
WG2773267-1 MB		**NP**						
Aluminum (Al)-Dissolved			0.0020	MB-LOR	mg/L		0.001	19-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	19-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	19-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	19-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	19-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	19-MAY-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	19-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	19-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	19-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	19-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	19-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	19-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	19-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4048907								
WG2773267-1 MB		**NP**						
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	19-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	19-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	19-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	19-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	19-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	19-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	19-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	19-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	19-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	19-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	19-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	19-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	19-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	19-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	19-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	19-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	19-MAY-18
NH3-L-F-CL	**Water**							
Batch R4048807								
WG2777047-6 LCS								
Ammonia as N			104.0		%		85-115	21-MAY-18
WG2777047-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	21-MAY-18
NO2-L-IC-N-CL	**Water**							
Batch R4046057								
WG2773990-11 DUP		**L2093281-4**						
Nitrite (as N)		0.0101	0.0096		mg/L	5.1	20	13-MAY-18
WG2773990-10 LCS								
Nitrite (as N)			103.8		%		90-110	13-MAY-18
WG2773990-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	13-MAY-18
WG2773990-12 MS		**L2093281-4**						
Nitrite (as N)			93.3		%		75-125	13-MAY-18
NO3-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4046057								
WG2773990-11 DUP		**L2093281-4**						
Nitrate (as N)		0.147	0.148		mg/L	0.5	20	13-MAY-18
WG2773990-10 LCS								
Nitrate (as N)			99.2		%		90-110	13-MAY-18
WG2773990-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	13-MAY-18
WG2773990-12 MS		**L2093281-4**						
Nitrate (as N)			94.0		%		75-125	13-MAY-18
ORP-CL	**Water**							
Batch R4049848								
WG2776341-7 CRM		**CL-ORP**						
ORP			224		mV		210-230	18-MAY-18
WG2776341-8 CRM		**CL-ORP**						
ORP			218		mV		210-230	18-MAY-18
P-T-L-COL-ED	**Water**							
Batch R4051047								
WG2777519-10 LCS								
Phosphorus (P)-Total			99.0		%		80-120	22-MAY-18
WG2777519-12 LCS								
Phosphorus (P)-Total			98.8		%		80-120	22-MAY-18
WG2777519-2 LCS								
Phosphorus (P)-Total			98.6		%		80-120	22-MAY-18
WG2777519-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	22-MAY-18
WG2777519-11 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	22-MAY-18
WG2777519-9 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	22-MAY-18
Batch R4054168								
WG2778484-2 LCS								
Phosphorus (P)-Total			102.4		%		80-120	23-MAY-18
WG2778484-6 LCS								
Phosphorus (P)-Total			103.6		%		80-120	23-MAY-18
WG2778484-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-MAY-18
WG2778484-5 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	23-MAY-18
P-TD-L-COL-ED	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-TD-L-COL-ED	**Water**							
Batch R4051047								
WG2777519-2 LCS								
Phosphorus (P)-Total	Dissolved		98.6		%		80-120	22-MAY-18
WG2777519-1 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	22-MAY-18
Batch R4054168								
WG2778484-2 LCS								
Phosphorus (P)-Total	Dissolved		102.4		%		80-120	23-MAY-18
WG2778484-6 LCS								
Phosphorus (P)-Total	Dissolved		103.6		%		80-120	23-MAY-18
WG2778484-1 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	23-MAY-18
WG2778484-5 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	23-MAY-18
PH-CL	**Water**							
Batch R4047087								
WG2775270-29 LCS								
pH			7.02		pH		6.9-7.1	17-MAY-18
PO4-DO-L-COL-ED	**Water**							
Batch R4041338								
WG2770922-10 LCS								
Orthophosphate-Dissolved (as P)			98.8		%		80-120	12-MAY-18
WG2770922-14 LCS								
Orthophosphate-Dissolved (as P)			98.8		%		80-120	12-MAY-18
WG2770922-2 LCS								
Orthophosphate-Dissolved (as P)			99.6		%		80-120	12-MAY-18
WG2770922-6 LCS								
Orthophosphate-Dissolved (as P)			97.2		%		80-120	12-MAY-18
WG2770922-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	12-MAY-18
WG2770922-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	12-MAY-18
WG2770922-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	12-MAY-18
WG2770922-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	12-MAY-18
SO4-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-CL	**Water**							
Batch R4046057								
WG2773990-11 DUP		**L2093281-4**						
Sulfate (SO4)		24.9	26.0		mg/L	4.2	20	13-MAY-18
WG2773990-10 LCS								
Sulfate (SO4)			99.96		%		90-110	13-MAY-18
WG2773990-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	13-MAY-18
WG2773990-12 MS		**L2093281-4**						
Sulfate (SO4)			95.5		%		75-125	13-MAY-18
SOLIDS-TDS-CL	**Water**							
Batch R4046810								
WG2773527-8 LCS								
Total Dissolved Solids			101.0		%		85-115	16-MAY-18
WG2773527-7 MB								
Total Dissolved Solids			<10		mg/L		10	16-MAY-18
TKN-L-F-CL	**Water**							
Batch R4048021								
WG2776289-6 LCS								
Total Kjeldahl Nitrogen			109.4		%		75-125	18-MAY-18
WG2776289-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	18-MAY-18
Batch R4048456								
WG2776840-3 DUP		**L2093281-1**						
Total Kjeldahl Nitrogen		0.316	0.317		mg/L	0.3	20	19-MAY-18
WG2776840-2 LCS								
Total Kjeldahl Nitrogen			112.7		%		75-125	19-MAY-18
WG2776840-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	19-MAY-18
WG2776840-4 MS		**L2093281-1**						
Total Kjeldahl Nitrogen			109.4		%		70-130	19-MAY-18
TSS-L-CL	**Water**							
Batch R4046807								
WG2774169-5 LCS								
Total Suspended Solids			97.1		%		85-115	16-MAY-18
WG2774169-4 MB								
Total Suspended Solids			<1.0		mg/L		1	16-MAY-18
TURBIDITY-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-CL	**Water**							
Batch R4041471								
WG2771092-2 LCS								
Turbidity			99.5		%		85-115	12-MAY-18
WG2771092-1 MB								
Turbidity			<0.10		NTU		0.1	12-MAY-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	10-MAY-18 11:45	17-MAY-18 17:00	0.25	173	hours	EHTR-FM
	2	10-MAY-18 13:10	17-MAY-18 17:00	0.25	172	hours	EHTR-FM
	3	10-MAY-18 15:10	17-MAY-18 17:00	0.25	170	hours	EHTR-FM
	4	10-MAY-18 09:15	17-MAY-18 17:00	0.25	176	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2093281 were received on 11-MAY-18 09:15.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2093281-COFC

COC ID: 20180510Q2GW

TURNAROUND TIM

PROJECT/CLIENT INFO							
Facility Name / Job#	Elkview Operations			Lab Name	ALS Calgary		
Job Description	Q2 Ground Water Sampling			Lab Contact	Lyudmyla Sh		
Project Manager	Cameron Griffin			Email	Lyundyla.Shv		
Email	Cameron.Griffin@Teck.com			Address	2559 29 St NE,		
Address	RR#1 HWY# 3						
City	Sparwood	Province	BC	City	Calgary	Province	AB
Postal Code	V1C 4C3	Country	Canada	Postal Code	T1Y 7B5	Country	Canada
Phone Number	1-250-865-5289			Phone Number	1 403 291 9897		

	Excel	PDF	EDD
	X	X	X
			X
Email 3: James.Boldt@teck.com	X	X	X
Email 4: Cameron.Griffin@teck.com	X	X	X
Email 5: Teck.Lab.Results@sharepoint.teck.com	X	X	X
PO # 538700			

SAMPLE DETAILS / ANALYSIS REQUESTED

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTERED	PRESERVED	TECK COAL-ROUTINE-VA (E305.1)	True Colour	TECK COAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorus	TKN/TOC (APHA 4500-NORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	Total Nitrogen for BC (NO2 and NO3)	EPH (C10-C32)	T-Mercury	D-Mercury
									DETAILS		No	No	Yes Nitric	Yes Sulphuric		No Sulphuric	No	No	No	No Sodium Bisulphate	No HCl	Yes HCl
1	EV_MCgwS_WG_2018-05_NP	EV_MCgwS	WG	N	5/10/2018	11:45	G	5				1		1		1		1	1			
2	EV_MCgwD_WG_2018-05_NP	EV_MCgwD	WG	N	5/10/2018	13:10	G	5				1		1		1		1	1			
3	EV_LSgw_WG_2018-05_NP	EV_LSgw	WG	N	5/10/2018	15:10	G	5				1		1		1			1			1
4	EV_ECgw_WG_2018-05_NP	EV_ECgw	WG	N	5/10/2018	9:15	G	5				1		1		1			1			1
							Total	20														

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Ultra-trace Mercury samples are unfiltered and unpreserved Total Methyl Mercury samples are preserved but unfiltered Total Selenium samples are preserved but unfiltered Dissolved Selenium samples are preserved and filtered	Bryan Ogden	May 10, 2018		5/11 - 11:12

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Bryan Ogden	Mobile #	250 425 3629
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	May 10, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 17-MAY-18
Report Date: 30-MAY-18 10:34 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2096222

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATION
C of C Numbers: 20180516Q2GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2096222-1	L2096222-2			
	Description	WG	WG			
	Sampled Date	16-MAY-18	16-MAY-18			
	Sampled Time	12:35	13:35			
	Client ID	EV_ER1GWS_WG_2018-05_NP	EV_ER1GWD_WG_2018-05_NP			
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0			
	Conductivity (@ 25C) (uS/cm)	512	418			
	Hardness (as CaCO3) (mg/L)	268	228			
	pH (pH)	7.95	8.16			
	ORP (mV)	329	322			
	Total Suspended Solids (mg/L)	<1.0	567			
	Total Dissolved Solids (mg/L)	379	293			
	Turbidity (NTU)	0.12	195			
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	3.2	1.8			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	209	225			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	209	225			
	Ammonia as N (mg/L)	<0.0050	0.0060			
	Bromide (Br) (mg/L)	<0.050	<0.050			
	Chloride (Cl) (mg/L)	17.5	4.67			
	Fluoride (F) (mg/L)	0.170	0.201			
	Ion Balance (%)	91.0	80.3			
	Nitrate (as N) (mg/L)	1.89	1.44			
	Nitrite (as N) (mg/L)	<0.0010	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	<0.20 RRV	0.75			
	Total Nitrogen (mg/L)	1.89	2.18			
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	0.0015			
	Phosphorus (P)-Total Dissolved (mg/L)	0.0018	0.0029 RRV			
	Phosphorus (P)-Total (mg/L)	0.0022	0.917 RRV			
	Sulfate (SO4) (mg/L)	77.7	54.4			
	Anion Sum (meq/L)	6.43	5.87			
	Cation Sum (meq/L)	5.84	4.71			
	Cation - Anion Balance (%)	-4.7	-10.9			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50	0.59			
	Total Organic Carbon (mg/L)	<0.50	3.12			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	0.0080			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00011	0.00011			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2096222-1	L2096222-2			
	Description	WG	WG			
	Sampled Date	16-MAY-18	16-MAY-18			
	Sampled Time	12:35	13:35			
	Client ID	EV_ER1GWS_WG_2018-05_NP	EV_ER1GWD_WG_2018-05_NP			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Barium (Ba)-Dissolved (mg/L)	0.128	0.0786			
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	0.013	0.012			
	Cadmium (Cd)-Dissolved (ug/L)	0.0184	<0.0050			
	Calcium (Ca)-Dissolved (mg/L)	74.5	59.5			
	Chromium (Cr)-Dissolved (mg/L)	0.00025	0.00072			
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10			
	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	0.0076	0.0072			
	Magnesium (Mg)-Dissolved (mg/L)	19.9	19.2			
	Manganese (Mn)-Dissolved (mg/L)	<0.00010	0.00253			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000800	0.00145			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00056			
	Potassium (K)-Dissolved (mg/L)	0.945	0.610			
	Selenium (Se)-Dissolved (ug/L)	8.02	7.52			
	Silicon (Si)-Dissolved (mg/L)	2.75	2.75			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	10.8	3.25			
	Strontium (Sr)-Dissolved (mg/L)	0.209	0.193			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.000999	0.00148			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Bromide (Br)	MS-B	L2096222-1
Matrix Spike	Chloride (Cl)	MS-B	L2096222-1, -2
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2096222-1, -2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2096222-1, -2
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2096222-1, -2
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2096222-1, -2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2096222-1, -2
Matrix Spike	Nitrate (as N)	MS-B	L2096222-2
Matrix Spike	Sulfate (SO4)	MS-B	L2096222-1, -2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-ED	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-ED	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

Reference Information

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-ED Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-ED Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-ED Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-ED Water Total Dissolved P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorous is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-ED Water Sulfate in Water by IC EPA 300.1 (mod)

Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-F-CL Water Total Kjeldahl Nitrogen by Fluorescence APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180516Q2GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4056385								
WG2781150-11 LCS								
Acidity (as CaCO3)			104.8		%		85-115	25-MAY-18
WG2781150-10 MB								
Acidity (as CaCO3)			1.8		mg/L		2	25-MAY-18
ALK-MAN-CL	**Water**							
Batch R4056267								
WG2780975-8 LCS								
Alkalinity, Total (as CaCO3)			104.2		%		85-115	24-MAY-18
WG2780975-7 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	24-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4056443								
WG2776476-2 LCS								
Beryllium (Be)-Dissolved			97.1		%		80-120	25-MAY-18
WG2776476-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	25-MAY-18
BR-L-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-2 LCS								
Bromide (Br)			101.4		%		85-115	19-MAY-18
WG2775919-31 LCS								
Bromide (Br)			102.5		%		85-115	19-MAY-18
WG2775919-33 LCS								
Bromide (Br)			105.0		%		85-115	19-MAY-18
WG2775919-35 LCS								
Bromide (Br)			104.9		%		85-115	19-MAY-18
WG2775919-37 LCS								
Bromide (Br)			104.9		%		85-115	19-MAY-18
WG2775919-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18
WG2775919-32 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18
WG2775919-34 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18
WG2775919-36 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18
WG2775919-38 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-ED	**Water**							
Batch R4052949								
WG2776643-2 LCS								
Bromide (Br)			101.0		%		85-115	19-MAY-18
WG2776643-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4055043								
WG2779359-7 DUP		**L2096222-1**						
Dissolved Organic Carbon		<0.50	<0.50	RPD-NA	mg/L	N/A	20	22-MAY-18
WG2779359-10 LCS								
Dissolved Organic Carbon			96.0		%		80-120	22-MAY-18
WG2779359-6 LCS								
Dissolved Organic Carbon			103.8		%		80-120	22-MAY-18
WG2779359-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	22-MAY-18
WG2779359-9 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	22-MAY-18
WG2779359-8 MS		**L2096222-1**						
Dissolved Organic Carbon			102.5		%		70-130	22-MAY-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4055043								
WG2779359-7 DUP		**L2096222-1**						
Total Organic Carbon		<0.50	<0.50	RPD-NA	mg/L	N/A	20	22-MAY-18
WG2779359-10 LCS								
Total Organic Carbon			102.4		%		80-120	22-MAY-18
WG2779359-6 LCS								
Total Organic Carbon			98.6		%		80-120	22-MAY-18
WG2779359-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	22-MAY-18
WG2779359-9 MB								
Total Organic Carbon			<0.50		mg/L		0.5	22-MAY-18
WG2779359-8 MS		**L2096222-1**						
Total Organic Carbon			102.0		%		70-130	22-MAY-18
CL-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-2 LCS								
Chloride (Cl)			101.7		%		90-110	18-MAY-18
WG2775919-31 LCS								
Chloride (Cl)			103.6		%		90-110	18-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-33 LCS								
Chloride (Cl)			103.5		%		90-110	18-MAY-18
WG2775919-35 LCS								
Chloride (Cl)			103.7		%		90-110	18-MAY-18
WG2775919-37 LCS								
Chloride (Cl)			103.7		%		90-110	18-MAY-18
WG2775919-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-MAY-18
WG2775919-32 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-MAY-18
WG2775919-34 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-MAY-18
WG2775919-36 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-MAY-18
WG2775919-38 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-MAY-18
COLOUR-TRUE-CL	**Water**							
Batch R4047175								
WG2775334-2 LCS								
Colour, True			100.9		%		85-115	17-MAY-18
WG2775334-1 MB								
Colour, True			<5.0		CU		5	17-MAY-18
EC-L-PCT-CL	**Water**							
Batch R4056267								
WG2780975-8 LCS								
Conductivity (@ 25C)			102.0		%		90-110	24-MAY-18
WG2780975-7 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	24-MAY-18
F-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-2 LCS								
Fluoride (F)			102.1		%		90-110	18-MAY-18
WG2775919-31 LCS								
Fluoride (F)			106.4		%		90-110	18-MAY-18
WG2775919-33 LCS								
Fluoride (F)			106.1		%		90-110	18-MAY-18
WG2775919-35 LCS								
Fluoride (F)			103.7		%		90-110	18-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-37 LCS								
Fluoride (F)			104.5		%		90-110	18-MAY-18
WG2775919-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-MAY-18
WG2775919-32 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-MAY-18
WG2775919-34 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-MAY-18
WG2775919-36 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-MAY-18
WG2775919-38 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-MAY-18
HG-D-CVAA-VA	**Water**							
Batch R4051196								
WG2776475-14 LCS								
Mercury (Hg)-Dissolved			103.1		%		80-120	22-MAY-18
MET-D-CCMS-VA	**Water**							
Batch R4056443								
WG2776476-2 LCS								
Aluminum (Al)-Dissolved			103.0		%		80-120	25-MAY-18
Antimony (Sb)-Dissolved			98.5		%		80-120	25-MAY-18
Arsenic (As)-Dissolved			101.2		%		80-120	25-MAY-18
Barium (Ba)-Dissolved			99.1		%		80-120	25-MAY-18
Bismuth (Bi)-Dissolved			96.0		%		80-120	25-MAY-18
Boron (B)-Dissolved			88.4		%		80-120	25-MAY-18
Cadmium (Cd)-Dissolved			99.6		%		80-120	25-MAY-18
Calcium (Ca)-Dissolved			98.5		%		80-120	25-MAY-18
Chromium (Cr)-Dissolved			103.3		%		80-120	25-MAY-18
Cobalt (Co)-Dissolved			100.9		%		80-120	25-MAY-18
Copper (Cu)-Dissolved			99.5		%		80-120	25-MAY-18
Iron (Fe)-Dissolved			100.1		%		80-120	25-MAY-18
Lead (Pb)-Dissolved			97.0		%		80-120	25-MAY-18
Lithium (Li)-Dissolved			95.2		%		80-120	25-MAY-18
Magnesium (Mg)-Dissolved			96.5		%		80-120	25-MAY-18
Manganese (Mn)-Dissolved			101.0		%		80-120	25-MAY-18
Molybdenum (Mo)-Dissolved			100.0		%		80-120	25-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4056443								
WG2776476-2 LCS								
Nickel (Ni)-Dissolved			100.7		%		80-120	25-MAY-18
Potassium (K)-Dissolved			105.6		%		80-120	25-MAY-18
Selenium (Se)-Dissolved			95.0		%		80-120	25-MAY-18
Silicon (Si)-Dissolved			100.7		%		80-120	25-MAY-18
Silver (Ag)-Dissolved			99.99		%		80-120	25-MAY-18
Sodium (Na)-Dissolved			101.3		%		80-120	25-MAY-18
Strontium (Sr)-Dissolved			101.3		%		80-120	25-MAY-18
Thallium (Tl)-Dissolved			96.7		%		80-120	25-MAY-18
Tin (Sn)-Dissolved			99.4		%		80-120	25-MAY-18
Titanium (Ti)-Dissolved			96.4		%		80-120	25-MAY-18
Uranium (U)-Dissolved			104.4		%		80-120	25-MAY-18
Vanadium (V)-Dissolved			102.4		%		80-120	25-MAY-18
Zinc (Zn)-Dissolved			96.3		%		80-120	25-MAY-18
WG2776476-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	25-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	25-MAY-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	25-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	25-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	25-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	25-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	25-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	25-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4056443								
WG2776476-1 MB		**NP**						
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	25-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	25-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	25-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	25-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	25-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	25-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	25-MAY-18
NH3-L-F-CL	**Water**							
Batch R4057382								
WG2781669-6 LCS								
Ammonia as N			109.3		%		85-115	27-MAY-18
WG2781669-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	27-MAY-18
NO2-L-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-39 DUP		**L2096222-1**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	18-MAY-18
WG2775919-2 LCS								
Nitrite (as N)			104.3		%		90-110	18-MAY-18
WG2775919-31 LCS								
Nitrite (as N)			105.2		%		90-110	18-MAY-18
WG2775919-33 LCS								
Nitrite (as N)			106.0		%		90-110	18-MAY-18
WG2775919-35 LCS								
Nitrite (as N)			106.0		%		90-110	18-MAY-18
WG2775919-37 LCS								
Nitrite (as N)			105.9		%		90-110	18-MAY-18
WG2775919-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-MAY-18
WG2775919-32 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-MAY-18
WG2775919-34 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-36 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-MAY-18
WG2775919-38 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-MAY-18
WG2775919-40 MS		**L2096222-1**						
Nitrite (as N)			106.2		%		75-125	18-MAY-18
Batch R4052949								
WG2776643-15 LCS								
Nitrite (as N)			105.4		%		90-110	19-MAY-18
WG2776643-17 LCS								
Nitrite (as N)			105.1		%		90-110	19-MAY-18
WG2776643-19 LCS								
Nitrite (as N)			105.0		%		90-110	19-MAY-18
WG2776643-2 LCS								
Nitrite (as N)			104.5		%		90-110	19-MAY-18
WG2776643-21 LCS								
Nitrite (as N)			105.4		%		90-110	20-MAY-18
WG2776643-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	19-MAY-18
WG2776643-16 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	19-MAY-18
WG2776643-18 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	19-MAY-18
WG2776643-20 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	19-MAY-18
WG2776643-22 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	20-MAY-18
NO3-L-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-39 DUP		**L2096222-1**						
Nitrate (as N)		1.89	1.89		mg/L	0.1	20	18-MAY-18
WG2775919-2 LCS								
Nitrate (as N)			101.3		%		90-110	18-MAY-18
WG2775919-31 LCS								
Nitrate (as N)			102.6		%		90-110	18-MAY-18
WG2775919-33 LCS								
Nitrate (as N)			102.5		%		90-110	18-MAY-18
WG2775919-35 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-35 LCS								
Nitrate (as N)			104.0		%		90-110	18-MAY-18
WG2775919-37 LCS								
Nitrate (as N)			103.9		%		90-110	18-MAY-18
WG2775919-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-MAY-18
WG2775919-32 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-MAY-18
WG2775919-34 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-MAY-18
WG2775919-36 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-MAY-18
WG2775919-38 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-MAY-18
WG2775919-40 MS		**L2096222-1**						
Nitrate (as N)			95.3		%		75-125	18-MAY-18
Batch R4052949								
WG2776643-15 LCS								
Nitrate (as N)			102.2		%		90-110	19-MAY-18
WG2776643-17 LCS								
Nitrate (as N)			102.3		%		90-110	19-MAY-18
WG2776643-19 LCS								
Nitrate (as N)			100.8		%		90-110	19-MAY-18
WG2776643-2 LCS								
Nitrate (as N)			102.2		%		90-110	19-MAY-18
WG2776643-21 LCS								
Nitrate (as N)			101.1		%		90-110	20-MAY-18
WG2776643-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	19-MAY-18
WG2776643-16 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	19-MAY-18
WG2776643-18 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	19-MAY-18
WG2776643-20 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	19-MAY-18
WG2776643-22 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	20-MAY-18
ORP-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ORP-CL	**Water**							
Batch R4056365								
WG2781106-7 CRM		**CL-ORP**						
ORP			218		mV		210-230	25-MAY-18
WG2781106-8 CRM		**CL-ORP**						
ORP			223		mV		210-230	25-MAY-18
P-T-L-COL-ED	**Water**							
Batch R4061763								
WG2783267-5 DUP		**L2096222-2**						
Phosphorus (P)-Total		0.917	0.913		mg/L	0.4	20	29-MAY-18
WG2783267-10 LCS								
Phosphorus (P)-Total			105.4		%		80-120	29-MAY-18
WG2783267-12 LCS								
Phosphorus (P)-Total			105.6		%		80-120	29-MAY-18
WG2783267-2 LCS								
Phosphorus (P)-Total			106.0		%		80-120	29-MAY-18
WG2783267-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	29-MAY-18
WG2783267-11 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	29-MAY-18
WG2783267-9 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	29-MAY-18
WG2783267-6 MS		**L2096222-2**						
Phosphorus (P)-Total			72.7		%		70-130	29-MAY-18
P-TD-L-COL-ED	**Water**							
Batch R4061763								
WG2783267-5 DUP		**L2096222-2**						
Phosphorus (P)-Total	Dissolved	0.0029	0.0030		mg/L	3.4	20	29-MAY-18
WG2783267-10 LCS								
Phosphorus (P)-Total	Dissolved		105.4		%		80-120	29-MAY-18
WG2783267-12 LCS								
Phosphorus (P)-Total	Dissolved		105.6		%		80-120	29-MAY-18
WG2783267-2 LCS								
Phosphorus (P)-Total	Dissolved		106.0		%		80-120	29-MAY-18
WG2783267-1 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	29-MAY-18
WG2783267-11 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	29-MAY-18
WG2783267-9 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	29-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-TD-L-COL-ED	**Water**							
Batch R4061763								
WG2783267-6 MS		**L2096222-2**						
Phosphorus (P)-Total Dissolved			102.8		%		70-130	29-MAY-18
PH-CL	**Water**							
Batch R4056267								
WG2780975-8 LCS								
pH			7.03		pH		6.9-7.1	24-MAY-18
PO4-DO-L-COL-ED	**Water**							
Batch R4048077								
WG2775864-10 LCS								
Orthophosphate-Dissolved (as P)			94.6		%		80-120	18-MAY-18
WG2775864-14 LCS								
Orthophosphate-Dissolved (as P)			96.4		%		80-120	18-MAY-18
WG2775864-18 LCS								
Orthophosphate-Dissolved (as P)			96.6		%		80-120	18-MAY-18
WG2775864-2 LCS								
Orthophosphate-Dissolved (as P)			91.4		%		80-120	18-MAY-18
WG2775864-6 LCS								
Orthophosphate-Dissolved (as P)			95.8		%		80-120	18-MAY-18
WG2775864-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-17 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
SO4-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-2 LCS								
Sulfate (SO4)			102.5		%		90-110	18-MAY-18
WG2775919-31 LCS								
Sulfate (SO4)			104.7		%		90-110	18-MAY-18
WG2775919-33 LCS								
Sulfate (SO4)			104.6		%		90-110	18-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-35 LCS								
Sulfate (SO4)			104.6		%		90-110	18-MAY-18
WG2775919-37 LCS								
Sulfate (SO4)			104.7		%		90-110	18-MAY-18
WG2775919-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-MAY-18
WG2775919-32 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-MAY-18
WG2775919-34 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-MAY-18
WG2775919-36 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-MAY-18
WG2775919-38 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-MAY-18
SOLIDS-TDS-CL	**Water**							
Batch R4055237								
WG2778321-5 LCS								
Total Dissolved Solids			96.6		%		85-115	23-MAY-18
WG2778321-4 MB								
Total Dissolved Solids			<10		mg/L		10	23-MAY-18
TKN-F-CL	**Water**							
Batch R4052888								
WG2778478-6 LCS								
Total Kjeldahl Nitrogen			92.2		%		75-125	22-MAY-18
WG2778478-5 MB								
Total Kjeldahl Nitrogen			<0.20		mg/L		0.2	22-MAY-18
TSS-L-CL	**Water**							
Batch R4055442								
WG2779027-2 LCS								
Total Suspended Solids			91.1		%		85-115	23-MAY-18
WG2779027-1 MB								
Total Suspended Solids			<1.0		mg/L		1	23-MAY-18
TURBIDITY-CL	**Water**							
Batch R4048158								
WG2776348-8 LCS								
Turbidity			98.5		%		85-115	18-MAY-18
WG2776348-7 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-CL	**Water**							
Batch R4048158								
WG2776348-7 MB								
Turbidity			<0.10		NTU		0.1	18-MAY-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	16-MAY-18 12:35	24-MAY-18 16:00	0.25	195	hours	EHTR-FM
	2	16-MAY-18 13:35	24-MAY-18 16:00	0.25	194	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2096222 were received on 17-MAY-18 08:55.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 20180516Q2GW

TURNAROUND TIME:

L2096222-COFC

PROJECT/CLIENT INFO				LABORAT				Excel	PDF	EDD
Facility Name / Job#	Elkview Operations			Lab Name	ALS Calgary			X	X	X
Job Description	Q2 Ground Water Sampling			Lab Contact	Lyudmyla Shvets					X
Project Manager	Cameron Griffin			Email	Lyudmyla.Shvets@alsglot			X	X	X
Email	Cameron.Griffin@Teck.com			Address	2559 29 St NE,			X	X	X
Address	RR#1 HWY# 3						Email 5:	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO #	538700	
Postal Code	V1C 4C3	Country	Canada	Postal Code	T1Y 7B5	Country	Canada			
Phone Number	1-250-865-5289			Phone Number	1 403 291 9897					

SAMPLE DETAILS								ANALYSIS REQUESTED												
								FILTERED	No	No	Yes	Yes		No	No		No	No	No	No	Yes
								PRESERVED			Nitric	Sulphuric		Sulphuric				Sodium Bisulphate	HCl	HCl
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	SAMPLING	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorus	TKN/TOC (APHA 4500-N/ORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	Total Nitrogen for BC (NO2 and NO3)	EPH (C10-C32)	T-Mercury	D-Mercury
EV_ER1gwS_WG_2018-05_NP	EV_ER1gwS	WG	N	5/16/2018	12:35	G	5		1		1	1		1		1	1			
EV_ER1gwD_WG_2018-05_NP	EV_ER1gwD	WG	N	5/16/2018	13:35	G	5		1		1	1		1		1	1			
						Total	10													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Ultra-trace Mercury samples are unfiltered and unpreserved Total Methyl Mercury samples are preserved but unfiltered Total Selenium samples are preserved but unfiltered Dissolved Selenium samples are preserved and filtered	Bryan Ogden	May 16, 2018		5/17 8:55

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Bryan Ogden	Mobile #	250 425 3629
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	May 16, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 16-MAY-18
Report Date: 07-JUN-18 17:58 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2096342

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180515Q2GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2096342-1	L2096342-2	L2096342-3	L2096342-4	L2096342-5
Description	WG	WG	WG	WG	WG
Sampled Date	15-MAY-18	15-MAY-18	15-MAY-18	15-MAY-18	15-MAY-18
Sampled Time	10:25	10:30	10:35	12:40	10:40
Client ID	EV_OCGW_WG_2018-05_NP	EV_MC5GW_WG_2018-05_NP	EV_MC6GW_WG_2018-05_NP	EV_GCGW_WG_2018-05_NP	EV_MC7GW_WG_2018-05_NP
Grouping / **Analyte**					
WATER					
Physical Tests					
Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (@ 25C) (uS/cm)	467	455	<2.0	409	<2.0
Hardness (as CaCO3) (mg/L)	146	149	<0.50	235	
pH (pH)	8.41	8.54	5.63	8.15	5.64
ORP (mV)	296	279	413	247	498
Total Suspended Solids (mg/L)	1.7	<1.0	<1.0	14.3	<1.0
Total Dissolved Solids (mg/L)	288 DLHC	298 DLHC	<10	264 DLHC	<10
Turbidity (NTU)	1.59	0.92	0.29	6.62	<0.10
Anions and Nutrients					
Acidity (as CaCO3) (mg/L)	<1.0	<1.0	1.1	1.5	1.9
Alkalinity, Bicarbonate (as CaCO3) (mg/L)	171	167	<1.0	157	<1.0
Alkalinity, Carbonate (as CaCO3) (mg/L)	10.8	16.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3) (mg/L)	181	183	<1.0	157	<1.0
Ammonia as N (mg/L)	0.0506	0.0427	<0.0050	0.0227	0.0081
Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl) (mg/L)	2.10	2.10	<0.50	4.03	<0.50
Fluoride (F) (mg/L)	1.28	1.28	<0.020	0.532	<0.020
Ion Balance (%)	95.7	98.6	0.0	109	0.0
Nitrate (as N) (mg/L)	0.0114	0.0336	<0.0050	0.0055	<0.0050
Nitrite (as N) (mg/L)	0.0031	0.0027	<0.0010	0.0015	<0.0010
Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	<0.050	0.098	<0.050
Total Nitrogen (mg/L)	<0.050	<0.050	<0.050	0.105	<0.050
Orthophosphate-Dissolved (as P) (mg/L)	0.0043	0.0053	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total Dissolved (mg/L)	0.0102	0.0103	<0.0010	0.0016	0.0015
Phosphorus (P)-Total (mg/L)	0.0133	0.0117	<0.0010	0.0100	<0.0010
Sulfate (SO4) (mg/L)	62.9	60.3	<0.30	59.0	<0.30
Anion Sum (meq/L)	5.06	5.03	<0.10	4.50	<0.10
Cation Sum (meq/L)	4.84	4.96	<0.10	4.90	<0.10
Cation - Anion Balance (%)	-2.2	-0.7	0.0	4.2	0.0
Organic / Inorganic Carbon					
Dissolved Organic Carbon (mg/L)	0.85 RRV	0.73 RRV	<0.50	2.06	<0.50
Total Organic Carbon (mg/L)	0.50	<0.50	<0.50	2.46	<0.50
Dissolved Metals					
Dissolved Mercury Filtration Location	LAB	LAB	LAB	FIELD	LAB
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	LAB
Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Arsenic (As)-Dissolved (mg/L)	0.00148	0.00141	<0.00010	0.00201	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2096342-1	L2096342-2	L2096342-3	L2096342-4	L2096342-5
Description	WG	WG	WG	WG	WG
Sampled Date	15-MAY-18	15-MAY-18	15-MAY-18	15-MAY-18	15-MAY-18
Sampled Time	10:25	10:30	10:35	12:40	10:40
Client ID	EV_OCGW_WG_2018-05_NP	EV_MC5GW_WG_2018-05_NP	EV_MC6GW_WG_2018-05_NP	EV_GCGW_WG_2018-05_NP	EV_MC7GW_WG_2018-05_NP
Grouping / **Analyte**					
WATER					
Dissolved Metals Barium (Ba)-Dissolved (mg/L)	0.0559	0.0586	<0.00010	0.0772	
Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)-Dissolved (mg/L)	0.102	0.102	<0.010	0.013	
Cadmium (Cd)-Dissolved (ug/L)	0.0073	<0.0050	<0.0050	<0.0050	
Calcium (Ca)-Dissolved (mg/L)	26.8	26.3	<0.050	64.5	<0.050
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Cobalt (Co)-Dissolved (ug/L)	0.20	0.19	<0.10	0.27	
Copper (Cu)-Dissolved (mg/L)	0.00218	<0.00050	<0.00050	<0.00050	
Iron (Fe)-Dissolved (mg/L)	0.185	0.205	<0.010	0.196	
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium (Li)-Dissolved (mg/L)	0.0231	0.0231	<0.0010	0.0075	
Magnesium (Mg)-Dissolved (mg/L)	19.2	20.1	<0.10	18.0	<0.0050
Manganese (Mn)-Dissolved (mg/L)	0.0686	0.0664	<0.00010	0.101	
Mercury (Hg)-Dissolved (mg/L)				<0.0000050	
Mercury (Hg)-Dissolved (ug/L)	<0.00050	<0.00050	<0.00050		0.00091
Molybdenum (Mo)-Dissolved (mg/L)	0.0155	0.0153	<0.000050	0.00254	
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	0.00076	
Potassium (K)-Dissolved (mg/L)	1.62	1.65	<0.050	0.785	<0.050
Selenium (Se)-Dissolved (ug/L)	<0.050	<0.050	<0.050	<0.050	
Silicon (Si)-Dissolved (mg/L)	4.43	4.46	<0.050	4.22	
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Dissolved (mg/L)	43.0	44.6	<0.050	3.82	<0.050
Strontium (Sr)-Dissolved (mg/L)	0.442	0.451	<0.00020	0.262	
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	0.000028	
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Uranium (U)-Dissolved (mg/L)	0.00134	0.00136	<0.000010	0.00119	
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc (Zn)-Dissolved (mg/L)	0.0074	<0.0010	0.0011 RRV	0.0016	
Hydrocarbons EPH10-19 (mg/L)	<0.25	<0.25	<0.25		<0.25
EPH (C10-C32) (mg/L)	<0.50	<0.50	<0.50		<0.50
EPH19-32 (mg/L)	<0.25	<0.25	<0.25		<0.25
TEH (C10-C30) (mg/L)	<0.25	<0.25	<0.25		<0.25

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Numbe	Client Sample ID	Qualifier	Description
L2096342-5	EV_MC7GW_WG_2018-05_I	SFPL	Sample was Filtered and Preserved at the laboratory - TDP
		SPL	Sample was Preserved at the laboratory - TP

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Bromide (Br)	MS-B	L2096342-1, -2, -3, -4, -5
Matrix Spike	Chloride (Cl)	MS-B	L2096342-1, -2, -3, -4, -5
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2096342-3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2096342-4
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2096342-3
Matrix Spike	Copper (Cu)-Dissolved	MS-B	L2096342-3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2096342-4
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2096342-3
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2096342-3
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2096342-4
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2096342-4
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2096342-3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2096342-4
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2096342-3
Matrix Spike	Sulfate (SO4)	MS-B	L2096342-1, -2, -3, -4, -5

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-ED	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The

Reference Information

carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-ED Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL Water Colour (True) by Spectrometer APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

EPH(10-32)-CALC-CL Water Sum of EPH (10-32) Sum of EPH - Auto Calculated

The sum of EPH(C10-C19) and EPH(C19-C32)

F-IC-N-ED Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-D-U-CVAF-VA Water Diss. Mercury in Water by CVAFS (Ultra) APHA 3030 B / EPA 1631 REV. E

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure may involve preliminary sample treatment by filtration (APHA 3030B) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-CL Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

Reference Information

NO2-L-IC-N-ED	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-ED	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-ED	Water	Total Dissolved P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorous is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-ED	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TEH-BC-VA-CL	Water	EPH (C10-C19) & EPH (C19-C32)	BCMOE EPH GCFID

Analysis is in accordance with BC MOE Lab Manual method "Extractable Petroleum Hydrocarbons in Water by GC/FID", v2.1, July 1999. Whole water samples are extracted with DCM prior to gas chromatography with flame ionization detection (GC-FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

TEH-WATER-VA-CL	Water	TEH (C10-C30)	EPA 3510/8000-GC-FID
TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Reference Information

ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180515Q2GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4053615								
WG2778771-15 DUP		**L2096342-4**						
Acidity (as CaCO3)		1.5	<1.0	RPD-NA	mg/L	N/A	20	22-MAY-18
WG2778771-14 LCS								
Acidity (as CaCO3)			104.8		%		85-115	22-MAY-18
WG2778771-13 MB								
Acidity (as CaCO3)			1.8		mg/L		2	22-MAY-18
ALK-MAN-CL	**Water**							
Batch R4049897								
WG2777473-12 DUP		**L2096342-1**						
Alkalinity, Total (as CaCO3)		181	182		mg/L	0.3	20	21-MAY-18
WG2777473-11 LCS								
Alkalinity, Total (as CaCO3)			102.6		%		85-115	21-MAY-18
WG2777473-14 LCS								
Alkalinity, Total (as CaCO3)			103.5		%		85-115	21-MAY-18
WG2777473-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	21-MAY-18
WG2777473-13 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	21-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4050726								
WG2776725-2 LCS								
Beryllium (Be)-Dissolved			94.4		%		80-120	21-MAY-18
WG2776725-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	21-MAY-18
Batch R4056213								
WG2776477-2 LCS								
Beryllium (Be)-Dissolved			97.6		%		80-120	25-MAY-18
WG2776477-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	25-MAY-18
BR-L-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-2 LCS								
Bromide (Br)			101.4		%		85-115	19-MAY-18
WG2775919-31 LCS								
Bromide (Br)			102.5		%		85-115	19-MAY-18
WG2775919-33 LCS								
Bromide (Br)			105.0		%		85-115	19-MAY-18
WG2775919-35 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-35 LCS								
Bromide (Br)			104.9		%		85-115	19-MAY-18
WG2775919-37 LCS								
Bromide (Br)			104.9		%		85-115	19-MAY-18
WG2775919-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18
WG2775919-32 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18
WG2775919-34 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18
WG2775919-36 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18
WG2775919-38 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-MAY-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4055043								
WG2779359-10 LCS								
Dissolved Organic Carbon			96.0		%		80-120	22-MAY-18
WG2779359-9 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	22-MAY-18
Batch R4055097								
WG2779378-15 DUP		**L2096342-5**						
Dissolved Organic Carbon		<0.50	<0.50	RPD-NA	mg/L	N/A	20	22-MAY-18
WG2779378-10 LCS								
Dissolved Organic Carbon			94.3		%		80-120	22-MAY-18
WG2779378-14 LCS								
Dissolved Organic Carbon			101.2		%		80-120	24-MAY-18
WG2779378-13 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	24-MAY-18
WG2779378-9 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	22-MAY-18
WG2779378-16 MS		**L2096342-5**						
Dissolved Organic Carbon			102.0		%		70-130	22-MAY-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4055043								
WG2779359-10 LCS								
Total Organic Carbon			102.4		%		80-120	22-MAY-18
WG2779359-9 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4055043								
WG2779359-9 MB								
Total Organic Carbon			<0.50		mg/L		0.5	22-MAY-18
Batch R4055097								
WG2779378-15 DUP		**L2096342-5**						
Total Organic Carbon		<0.50	<0.50	RPD-NA	mg/L	N/A	20	22-MAY-18
WG2779378-14 LCS								
Total Organic Carbon			100.1		%		80-120	24-MAY-18
WG2779378-13 MB								
Total Organic Carbon			<0.50		mg/L		0.5	24-MAY-18
WG2779378-9 MB								
Total Organic Carbon			<0.50		mg/L		0.5	24-MAY-18
WG2779378-16 MS		**L2096342-5**						
Total Organic Carbon			100.6		%		70-130	22-MAY-18
CL-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-2 LCS								
Chloride (Cl)			101.7		%		90-110	18-MAY-18
WG2775919-31 LCS								
Chloride (Cl)			103.6		%		90-110	18-MAY-18
WG2775919-33 LCS								
Chloride (Cl)			103.5		%		90-110	18-MAY-18
WG2775919-35 LCS								
Chloride (Cl)			103.7		%		90-110	18-MAY-18
WG2775919-37 LCS								
Chloride (Cl)			103.7		%		90-110	18-MAY-18
WG2775919-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-MAY-18
WG2775919-32 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-MAY-18
WG2775919-34 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-MAY-18
WG2775919-36 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-MAY-18
WG2775919-38 MB								
Chloride (Cl)			<0.50		mg/L		0.5	18-MAY-18
COLOUR-TRUE-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COLOUR-TRUE-CL	**Water**							
Batch R4047175								
WG2775334-3 DUP		**L2096342-5**						
Colour, True		<5.0	<5.0	RPD-NA	CU	N/A	20	17-MAY-18
WG2775334-2 LCS								
Colour, True			100.9		%		85-115	17-MAY-18
WG2775334-5 LCS								
Colour, True			99.0		%		85-115	17-MAY-18
WG2775334-1 MB								
Colour, True			<5.0		CU		5	17-MAY-18
WG2775334-4 MB								
Colour, True			<5.0		CU		5	17-MAY-18
EC-L-PCT-CL	**Water**							
Batch R4049897								
WG2777473-12 DUP		**L2096342-1**						
Conductivity (@ 25C)		467	468		uS/cm	0.2	10	21-MAY-18
WG2777473-11 LCS								
Conductivity (@ 25C)			106.4		%		90-110	21-MAY-18
WG2777473-14 LCS								
Conductivity (@ 25C)			106.5		%		90-110	21-MAY-18
WG2777473-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	21-MAY-18
WG2777473-13 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	21-MAY-18
F-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-2 LCS								
Fluoride (F)			102.1		%		90-110	18-MAY-18
WG2775919-31 LCS								
Fluoride (F)			106.4		%		90-110	18-MAY-18
WG2775919-33 LCS								
Fluoride (F)			106.1		%		90-110	18-MAY-18
WG2775919-35 LCS								
Fluoride (F)			103.7		%		90-110	18-MAY-18
WG2775919-37 LCS								
Fluoride (F)			104.5		%		90-110	18-MAY-18
WG2775919-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-MAY-18
WG2775919-32 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-MAY-18

Quality Control Report

Workorder: L2096342 Report Date: 07-JUN-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-34 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-MAY-18
WG2775919-36 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-MAY-18
WG2775919-38 MB								
Fluoride (F)			<0.020		mg/L		0.02	18-MAY-18
HG-D-CVAA-VA	**Water**							
Batch R4051196								
WG2776475-30 LCS								
Mercury (Hg)-Dissolved			103.7		%		80-120	22-MAY-18
Batch R4055469								
WG2776475-29 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	24-MAY-18
HG-D-U-CVAF-VA	**Water**							
Batch R4051130								
WG2777471-2 LCS								
Mercury (Hg)-Dissolved			100.6		%		80-120	22-MAY-18
WG2777471-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.00050		ug/L		0.0005	22-MAY-18
Batch R4054547								
WG2777471-3 DUP		**L2096342-2**						
Mercury (Hg)-Dissolved		<0.00050	<0.00050	RPD-NA	ug/L	N/A	20	23-MAY-18
WG2778963-2 LCS								
Mercury (Hg)-Dissolved			102.8		%		80-120	23-MAY-18
WG2778963-1 MB								
Mercury (Hg)-Dissolved			<0.00050		ug/L		0.0005	23-MAY-18
WG2777471-4 MS		**L2096342-1**						
Mercury (Hg)-Dissolved			91.9		%		70-130	23-MAY-18
MET-D-CCMS-CL	**Water**							
Batch R4055038								
WG2779614-14 LCS		**TMRM**						
Calcium (Ca)-Dissolved			93.5		%		80-120	24-MAY-18
Magnesium (Mg)-Dissolved			108.4		%		80-120	24-MAY-18
Potassium (K)-Dissolved			101.5		%		80-120	24-MAY-18
Sodium (Na)-Dissolved			97.3		%		80-120	24-MAY-18
WG2779614-17 LCS		**TMRM**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R4055038								
WG2779614-17 LCS		**TMRM**						
Calcium (Ca)-Dissolved			99.7		%		80-120	24-MAY-18
Magnesium (Mg)-Dissolved			107.2		%		80-120	24-MAY-18
Potassium (K)-Dissolved			101.8		%		80-120	24-MAY-18
Sodium (Na)-Dissolved			96.0		%		80-120	24-MAY-18
WG2779614-2 LCS		**TMRM**						
Calcium (Ca)-Dissolved			101.7		%		80-120	24-MAY-18
Magnesium (Mg)-Dissolved			110.4		%		80-120	24-MAY-18
Potassium (K)-Dissolved			104.9		%		80-120	24-MAY-18
Sodium (Na)-Dissolved			100.3		%		80-120	24-MAY-18
WG2779614-20 LCS		**TMRM**						
Calcium (Ca)-Dissolved			98.8		%		80-120	24-MAY-18
Magnesium (Mg)-Dissolved			104.4		%		80-120	24-MAY-18
Potassium (K)-Dissolved			103.3		%		80-120	24-MAY-18
Sodium (Na)-Dissolved			99.6		%		80-120	24-MAY-18
WG2779614-23 LCS		**TMRM**						
Calcium (Ca)-Dissolved			102.5		%		80-120	24-MAY-18
Magnesium (Mg)-Dissolved			105.3		%		80-120	24-MAY-18
Potassium (K)-Dissolved			100.9		%		80-120	24-MAY-18
Sodium (Na)-Dissolved			93.7		%		80-120	24-MAY-18
WG2779614-26 LCS		**TMRM**						
Calcium (Ca)-Dissolved			101.8		%		80-120	24-MAY-18
Magnesium (Mg)-Dissolved			101.8		%		80-120	24-MAY-18
Potassium (K)-Dissolved			101.2		%		80-120	24-MAY-18
Sodium (Na)-Dissolved			100.8		%		80-120	24-MAY-18
WG2779614-4 LCS		**TMRM**						
Calcium (Ca)-Dissolved			99.7		%		80-120	24-MAY-18
Magnesium (Mg)-Dissolved			107.6		%		80-120	24-MAY-18
Potassium (K)-Dissolved			100.9		%		80-120	24-MAY-18
Sodium (Na)-Dissolved			103.4		%		80-120	24-MAY-18
WG2779614-6 LCS		**TMRM**						
Calcium (Ca)-Dissolved			96.0		%		80-120	24-MAY-18
Magnesium (Mg)-Dissolved			103.2		%		80-120	24-MAY-18
Potassium (K)-Dissolved			99.5		%		80-120	24-MAY-18
Sodium (Na)-Dissolved			97.2		%		80-120	24-MAY-18
WG2779614-9 LCS		**TMRM**						
Calcium (Ca)-Dissolved			90.2		%		80-120	24-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R4055038								
WG2779614-9 LCS		**TMRM**						
Magnesium (Mg)-Dissolved			106.4		%		80-120	24-MAY-18
Potassium (K)-Dissolved			99.1		%		80-120	24-MAY-18
Sodium (Na)-Dissolved			95.1		%		80-120	24-MAY-18
WG2779614-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
WG2779614-13 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
WG2779614-16 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
WG2779614-19 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
WG2779614-22 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
WG2779614-25 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
WG2779614-3 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R4055038								
WG2779614-3 MB								
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
WG2779614-5 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
WG2779614-8 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-MAY-18
MET-D-CCMS-VA	**Water**							
Batch R4050726								
WG2776725-2 LCS								
Aluminum (Al)-Dissolved			101.9		%		80-120	21-MAY-18
Antimony (Sb)-Dissolved			100.7		%		80-120	21-MAY-18
Arsenic (As)-Dissolved			102.9		%		80-120	21-MAY-18
Barium (Ba)-Dissolved			102.2		%		80-120	21-MAY-18
Bismuth (Bi)-Dissolved			93.1		%		80-120	21-MAY-18
Boron (B)-Dissolved			88.5		%		80-120	21-MAY-18
Cadmium (Cd)-Dissolved			102.3		%		80-120	21-MAY-18
Calcium (Ca)-Dissolved			96.0		%		80-120	21-MAY-18
Chromium (Cr)-Dissolved			101.5		%		80-120	21-MAY-18
Cobalt (Co)-Dissolved			101.0		%		80-120	21-MAY-18
Copper (Cu)-Dissolved			100.8		%		80-120	21-MAY-18
Iron (Fe)-Dissolved			98.0		%		80-120	21-MAY-18
Lead (Pb)-Dissolved			92.6		%		80-120	21-MAY-18
Lithium (Li)-Dissolved			89.6		%		80-120	21-MAY-18
Magnesium (Mg)-Dissolved			101.6		%		80-120	21-MAY-18
Manganese (Mn)-Dissolved			103.4		%		80-120	21-MAY-18
Molybdenum (Mo)-Dissolved			102.8		%		80-120	21-MAY-18
Nickel (Ni)-Dissolved			102.9		%		80-120	21-MAY-18
Potassium (K)-Dissolved			100.5		%		80-120	21-MAY-18
Selenium (Se)-Dissolved			101.4		%		80-120	21-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4050726								
WG2776725-2 LCS								
Silicon (Si)-Dissolved			103.2		%		80-120	21-MAY-18
Silver (Ag)-Dissolved			105.2		%		80-120	21-MAY-18
Sodium (Na)-Dissolved			103.9		%		80-120	21-MAY-18
Strontium (Sr)-Dissolved			103.9		%		80-120	21-MAY-18
Thallium (Tl)-Dissolved			92.5		%		80-120	21-MAY-18
Tin (Sn)-Dissolved			102.5		%		80-120	21-MAY-18
Titanium (Ti)-Dissolved			98.6		%		80-120	21-MAY-18
Uranium (U)-Dissolved			95.6		%		80-120	21-MAY-18
Vanadium (V)-Dissolved			103.4		%		80-120	21-MAY-18
Zinc (Zn)-Dissolved			95.6		%		80-120	21-MAY-18
WG2776725-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	21-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	21-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	21-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	21-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	21-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	21-MAY-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	21-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	21-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	21-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	21-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	21-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	21-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	21-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	21-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	21-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	21-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	21-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	21-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	21-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	21-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	21-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	21-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	21-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4050726								
WG2776725-1 MB		**NP**						
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	21-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	21-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	21-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	21-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	21-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	21-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	21-MAY-18
Batch R4056213								
WG2776477-2 LCS								
Aluminum (Al)-Dissolved			101.2		%		80-120	25-MAY-18
Antimony (Sb)-Dissolved			100.5		%		80-120	25-MAY-18
Arsenic (As)-Dissolved			98.6		%		80-120	25-MAY-18
Barium (Ba)-Dissolved			96.8		%		80-120	25-MAY-18
Bismuth (Bi)-Dissolved			99.1		%		80-120	25-MAY-18
Boron (B)-Dissolved			85.0		%		80-120	25-MAY-18
Cadmium (Cd)-Dissolved			99.7		%		80-120	25-MAY-18
Calcium (Ca)-Dissolved			91.4		%		80-120	25-MAY-18
Chromium (Cr)-Dissolved			97.1		%		80-120	25-MAY-18
Cobalt (Co)-Dissolved			97.0		%		80-120	25-MAY-18
Copper (Cu)-Dissolved			99.6		%		80-120	25-MAY-18
Iron (Fe)-Dissolved			92.0		%		80-120	25-MAY-18
Lead (Pb)-Dissolved			99.3		%		80-120	25-MAY-18
Lithium (Li)-Dissolved			100.1		%		80-120	25-MAY-18
Magnesium (Mg)-Dissolved			103.1		%		80-120	25-MAY-18
Manganese (Mn)-Dissolved			98.1		%		80-120	25-MAY-18
Molybdenum (Mo)-Dissolved			99.7		%		80-120	25-MAY-18
Nickel (Ni)-Dissolved			100.7		%		80-120	25-MAY-18
Potassium (K)-Dissolved			100.4		%		80-120	25-MAY-18
Selenium (Se)-Dissolved			98.9		%		80-120	25-MAY-18
Silicon (Si)-Dissolved			107.5		%		80-120	25-MAY-18
Silver (Ag)-Dissolved			100.7		%		80-120	25-MAY-18
Sodium (Na)-Dissolved			99.4		%		80-120	25-MAY-18
Strontium (Sr)-Dissolved			107.5		%		80-120	25-MAY-18
Thallium (Tl)-Dissolved			102.6		%		80-120	25-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4056213								
WG2776477-2 LCS								
Tin (Sn)-Dissolved			97.8		%		80-120	25-MAY-18
Titanium (Ti)-Dissolved			96.5		%		80-120	25-MAY-18
Uranium (U)-Dissolved			104.1		%		80-120	25-MAY-18
Vanadium (V)-Dissolved			102.2		%		80-120	25-MAY-18
Zinc (Zn)-Dissolved			92.4		%		80-120	25-MAY-18
WG2776477-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	25-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	25-MAY-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	25-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	25-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	25-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	25-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	25-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	25-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	25-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	25-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	25-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	25-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	25-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	25-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	25-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	25-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4056213								
WG2776477-1 MB		**NP**						
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	25-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	25-MAY-18
Batch R4056428								
WG2781204-2 LCS								
Aluminum (Al)-Dissolved			107.8		%		80-120	26-MAY-18
Antimony (Sb)-Dissolved			95.4		%		80-120	26-MAY-18
Arsenic (As)-Dissolved			102.0		%		80-120	26-MAY-18
Barium (Ba)-Dissolved			103.0		%		80-120	26-MAY-18
Bismuth (Bi)-Dissolved			97.8		%		80-120	26-MAY-18
Boron (B)-Dissolved			85.6		%		80-120	26-MAY-18
Cadmium (Cd)-Dissolved			102.2		%		80-120	26-MAY-18
Calcium (Ca)-Dissolved			95.8		%		80-120	26-MAY-18
Chromium (Cr)-Dissolved			102.2		%		80-120	26-MAY-18
Cobalt (Co)-Dissolved			104.4		%		80-120	26-MAY-18
Copper (Cu)-Dissolved			102.4		%		80-120	26-MAY-18
Iron (Fe)-Dissolved			99.4		%		80-120	26-MAY-18
Lead (Pb)-Dissolved			98.0		%		80-120	26-MAY-18
Lithium (Li)-Dissolved			88.2		%		80-120	26-MAY-18
Magnesium (Mg)-Dissolved			107.8		%		80-120	26-MAY-18
Manganese (Mn)-Dissolved			102.2		%		80-120	26-MAY-18
Molybdenum (Mo)-Dissolved			93.4		%		80-120	26-MAY-18
Nickel (Ni)-Dissolved			105.1		%		80-120	26-MAY-18
Potassium (K)-Dissolved			105.3		%		80-120	26-MAY-18
Selenium (Se)-Dissolved			95.0		%		80-120	26-MAY-18
Silicon (Si)-Dissolved			104.6		%		80-120	26-MAY-18
Silver (Ag)-Dissolved			96.6		%		80-120	26-MAY-18
Sodium (Na)-Dissolved			107.6		%		80-120	26-MAY-18
Strontium (Sr)-Dissolved			106.5		%		80-120	26-MAY-18
Thallium (Tl)-Dissolved			94.5		%		80-120	26-MAY-18
Tin (Sn)-Dissolved			96.3		%		80-120	26-MAY-18
Titanium (Ti)-Dissolved			101.4		%		80-120	26-MAY-18
Uranium (U)-Dissolved			93.0		%		80-120	26-MAY-18
Vanadium (V)-Dissolved			105.9		%		80-120	26-MAY-18
Zinc (Zn)-Dissolved			94.7		%		80-120	26-MAY-18
WG2781204-1		**NP**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4056428								
WG2781204-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	26-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	26-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	26-MAY-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	26-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	26-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	26-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	26-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	26-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	26-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	26-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	26-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	26-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	26-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	26-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	26-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	26-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	26-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	26-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	26-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	26-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	26-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	26-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	26-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	26-MAY-18
NH3-L-F-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-L-F-CL	**Water**							
Batch R4057382								
WG2781669-8 LCS								
Ammonia as N			107.8		%		85-115	27-MAY-18
WG2781669-7 MB								
Ammonia as N			<0.0050		mg/L		0.005	27-MAY-18
NO2-L-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-2 LCS								
Nitrite (as N)			104.3		%		90-110	18-MAY-18
WG2775919-31 LCS								
Nitrite (as N)			105.2		%		90-110	18-MAY-18
WG2775919-33 LCS								
Nitrite (as N)			106.0		%		90-110	18-MAY-18
WG2775919-35 LCS								
Nitrite (as N)			106.0		%		90-110	18-MAY-18
WG2775919-37 LCS								
Nitrite (as N)			105.9		%		90-110	18-MAY-18
WG2775919-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-MAY-18
WG2775919-32 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-MAY-18
WG2775919-34 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-MAY-18
WG2775919-36 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-MAY-18
WG2775919-38 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	18-MAY-18
NO3-L-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-2 LCS								
Nitrate (as N)			101.3		%		90-110	18-MAY-18
WG2775919-31 LCS								
Nitrate (as N)			102.6		%		90-110	18-MAY-18
WG2775919-33 LCS								
Nitrate (as N)			102.5		%		90-110	18-MAY-18
WG2775919-35 LCS								
Nitrate (as N)			104.0		%		90-110	18-MAY-18
WG2775919-37 LCS								
Nitrate (as N)			103.9		%		90-110	18-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-MAY-18
WG2775919-32 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-MAY-18
WG2775919-34 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-MAY-18
WG2775919-36 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-MAY-18
WG2775919-38 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	18-MAY-18
ORP-CL	**Water**							
Batch R4055926								
WG2780700-7 CRM		**CL-ORP**						
ORP			223		mV		210-230	24-MAY-18
WG2780700-8 CRM		**CL-ORP**						
ORP			219		mV		210-230	24-MAY-18
Batch R4056365								
WG2781106-7 CRM		**CL-ORP**						
ORP			218		mV		210-230	25-MAY-18
WG2781106-8 CRM		**CL-ORP**						
ORP			223		mV		210-230	25-MAY-18
WG2781106-9 DUP		**L2096342-2**						
ORP		279	278	J	mV	1.0	15	25-MAY-18
P-T-L-COL-ED	**Water**							
Batch R4061763								
WG2783267-7 DUP		**L2096342-5**						
Phosphorus (P)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-MAY-18
WG2783267-10 LCS								
Phosphorus (P)-Total			105.4		%		80-120	29-MAY-18
WG2783267-12 LCS								
Phosphorus (P)-Total			105.6		%		80-120	29-MAY-18
WG2783267-2 LCS								
Phosphorus (P)-Total			106.0		%		80-120	29-MAY-18
WG2783267-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	29-MAY-18
WG2783267-11 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	29-MAY-18
WG2783267-9 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-ED	**Water**							
Batch R4061763								
WG2783267-9 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	29-MAY-18
WG2783267-8 MS		**L2096342-5**						
Phosphorus (P)-Total			98.7		%		70-130	29-MAY-18
P-TD-L-COL-ED	**Water**							
Batch R4061763								
WG2783267-10 LCS								
Phosphorus (P)-Total	Dissolved		105.4		%		80-120	29-MAY-18
WG2783267-12 LCS								
Phosphorus (P)-Total	Dissolved		105.6		%		80-120	29-MAY-18
WG2783267-2 LCS								
Phosphorus (P)-Total	Dissolved		106.0		%		80-120	29-MAY-18
WG2783267-1 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	29-MAY-18
WG2783267-11 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	29-MAY-18
WG2783267-9 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	29-MAY-18
Batch R4075510								
WG2791186-5 DUP		**L2096342-5**						
Phosphorus (P)-Total	Dissolved	0.0015	0.0012	J	mg/L	0.0003	0.002	07-JUN-18
WG2791186-2 LCS								
Phosphorus (P)-Total	Dissolved		105.0		%		80-120	07-JUN-18
WG2791186-1 MB								
Phosphorus (P)-Total	Dissolved		<0.0010		mg/L		0.001	07-JUN-18
WG2791186-6 MS		**L2096342-5**						
Phosphorus (P)-Total	Dissolved		101.6		%		70-130	07-JUN-18
PH-CL	**Water**							
Batch R4049897								
WG2777473-12 DUP		**L2096342-1**						
pH		8.41	8.52	J	pH	0.11	0.2	21-MAY-18
WG2777473-11 LCS								
pH			7.00		pH		6.9-7.1	21-MAY-18
WG2777473-14 LCS								
pH			7.00		pH		6.9-7.1	21-MAY-18
PO4-DO-L-COL-ED	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-L-COL-ED	**Water**							
Batch R4048077								
WG2775864-10 LCS								
Orthophosphate-Dissolved (as P)			94.6		%		80-120	18-MAY-18
WG2775864-14 LCS								
Orthophosphate-Dissolved (as P)			96.4		%		80-120	18-MAY-18
WG2775864-18 LCS								
Orthophosphate-Dissolved (as P)			96.6		%		80-120	18-MAY-18
WG2775864-2 LCS								
Orthophosphate-Dissolved (as P)			91.4		%		80-120	18-MAY-18
WG2775864-6 LCS								
Orthophosphate-Dissolved (as P)			95.8		%		80-120	18-MAY-18
WG2775864-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-17 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
WG2775864-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-MAY-18
SO4-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-2 LCS								
Sulfate (SO4)			102.5		%		90-110	18-MAY-18
WG2775919-31 LCS								
Sulfate (SO4)			104.7		%		90-110	18-MAY-18
WG2775919-33 LCS								
Sulfate (SO4)			104.6		%		90-110	18-MAY-18
WG2775919-35 LCS								
Sulfate (SO4)			104.6		%		90-110	18-MAY-18
WG2775919-37 LCS								
Sulfate (SO4)			104.7		%		90-110	18-MAY-18
WG2775919-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-MAY-18
WG2775919-32 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-MAY-18
WG2775919-34 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-MAY-18
WG2775919-36 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-ED	**Water**							
Batch R4048238								
WG2775919-36 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-MAY-18
WG2775919-38 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	18-MAY-18
SOLIDS-TDS-CL	**Water**							
Batch R4054051								
WG2777315-12 DUP		**L2096342-1**						
Total Dissolved Solids		288	286		mg/L	0.7	20	22-MAY-18
WG2777315-11 LCS								
Total Dissolved Solids			101.0		%		85-115	22-MAY-18
WG2777315-10 MB								
Total Dissolved Solids			<10		mg/L		10	22-MAY-18
TEH-BC-VA-CL	**Water**							
Batch R4055391								
WG2779967-2 LCS								
EPH10-19			103.3		%		50-150	23-MAY-18
EPH19-32			105.6		%		50-150	23-MAY-18
WG2779967-1 MB								
EPH10-19			<0.25		mg/L		0.25	23-MAY-18
EPH19-32			<0.25		mg/L		0.25	23-MAY-18
TEH-WATER-VA-CL	**Water**							
Batch R4055391								
WG2779967-2 LCS								
TEH (C10-C30)			103.4		%		50-150	23-MAY-18
WG2779967-1 MB								
TEH (C10-C30)			<0.25		mg/L		0.25	23-MAY-18
TKN-L-F-CL	**Water**							
Batch R4048456								
WG2776840-14 LCS								
Total Kjeldahl Nitrogen			98.4		%		75-125	19-MAY-18
WG2776840-13 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	19-MAY-18
Batch R4052888								
WG2778478-11 DUP		**L2096342-2**						
Total Kjeldahl Nitrogen		<0.050	<0.050	RPD-NA	mg/L	N/A	20	22-MAY-18
WG2778478-10 LCS								
Total Kjeldahl Nitrogen			82.8		%		75-125	22-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-L-F-CL	**Water**							
Batch R4052888								
WG2778478-6 LCS								
Total Kjeldahl Nitrogen			92.2		%		75-125	22-MAY-18
WG2778478-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	22-MAY-18
WG2778478-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	22-MAY-18
WG2778478-12 MS		**L2096342-3**						
Total Kjeldahl Nitrogen			103.2		%		70-130	22-MAY-18
TSS-L-CL	**Water**							
Batch R4054052								
WG2777970-11 LCS								
Total Suspended Solids			97.6		%		85-115	22-MAY-18
WG2777970-10 MB								
Total Suspended Solids			<1.0		mg/L		1	22-MAY-18
TURBIDITY-CL	**Water**							
Batch R4048158								
WG2776348-8 LCS								
Turbidity			98.5		%		85-115	18-MAY-18
WG2776348-7 MB								
Turbidity			<0.10		NTU		0.1	18-MAY-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	15-MAY-18 10:25	21-MAY-18 11:00	0.25	144	hours	EHTR-FM
	2	15-MAY-18 10:30	21-MAY-18 11:00	0.25	144	hours	EHTR-FM
	3	15-MAY-18 10:35	21-MAY-18 11:00	0.25	144	hours	EHTR-FM
	4	15-MAY-18 12:40	21-MAY-18 11:00	0.25	142	hours	EHTR-FM
	5	15-MAY-18 10:40	21-MAY-18 11:00	0.25	144	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2096342 were received on 16-MAY-18 09:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 20180515Q2GW

TURNAROUND TIME:

L2096342-COFC

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations				
Job Description	Q2 Ground Water Sampling				
Project Manager	Cameron Griffin				
Email	Cameron.Griffin@Teck.com				
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Postal Code	V1C 4C3	Country	Canada		
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LABORA

Lab Name	ALS Calgary				
Lab Contact	Lyudmyla Shvets				
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Phone Number	1 403 291 9897				

	Excel	PDF	EDD
	Y	Y	Y
			Y
	Y	Y	Y
	Y	Y	Y
Email 5:	Y	Y	Y
PO #	5338700		

SAMPLE DETAILS

ANALYSIS REQUESTED

Filtered (F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTERED	PRESERVED	TECK.COAL-ROUTINE-VA (E105.1)	True Colour	TECK.COAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorus	TKN/TOC (APHA 4500-NORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	Total Nitrogen for BC (NO2 and NO3)	EPH (C10-C32)	T-Mercury	D-Mercury
										No	No	Yes	Yes		No	No	No	No	No	No	Yes
												Nitric	Sulphuric		Sulphuric				Sodium Bisulphate	HCl	HCl
1 EV_OCgw_WG_2018-05_NP	EV_OCgw	WG	N	5/15/2018	10:25	G	5			1		1	1		1		1	1	2		
2 EV_MC5gw_WG_2018-05_NP	EV_MC5gw	WG	N	5/15/2018	10:30	G	5			1		1	1		1		1	1	2		
3 EV_MC6gw_WG_2018-05_NP	EV_MC6gw	WG	N	5/15/2018	10:35	G	5			1		1	1		1		1	1	2		
4 EV_GCgw_WG_2018-05_NP	EV_GCgw	WG	N	5/15/2018	12:40	G	5			1		1	1		1			1			1
5 EV_MC7gw_WG_2018-05_NP	EV_MC7gw	WG	N	5/15/2018	10:40	G	5			1		1	1		1		1	1	2		
						Total	25														

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Ultra-trace Mercury samples are unfiltered and unpreserved
Total Methyl Mercury samples are preserved but unfiltered
Total Selenium samples are preserved but unfiltered
Dissolved Selenium samples are preserved and filtered

RELINQUISHED BY/AFFILIATION

Bryan Ogden

DATE/TIME

May 15, 2018

ACCEPTED BY/AFFILIATION

DATE/TIME

5/16 9:00

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Bryan Ogden	Mobile #	250 425 3629
Sampler's Signature		Date/Time	May 15, 2018

9

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 21-AUG-18
Report Date: 12-SEP-18 15:35 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2150459

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180820
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2150459-1	L2150459-2	L2150459-3	L2150459-4	L2150459-5
	Description	WG	WG	WG	WG	WG
	Sampled Date	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18
	Sampled Time	12:55	13:00	13:05	12:50	09:00
	Client ID	EV_MC5GW_WG_2018-08_NP	EV_MC6GW_WG_2018-08_NP	EV_MC7GW_WG_2018-08_NP	EV_OCGW_WG_2018-08_NP	EV_MCGWS_WG_2018-08_NP
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (@ 25C) (uS/cm)	471	<2.0	<2.0	486	820
	Hardness (as CaCO3) (mg/L)	154	<0.50	<0.50	154	388
	pH (pH)	8.35	5.82	5.85	8.57	8.28
	ORP (mV)	421	479	450	285	461
	Total Suspended Solids (mg/L)	3.9	<1.0	<1.0	4.7	4.3
	Total Dissolved Solids (mg/L)	308 DLHC	<10	<10	294 DLHC	532 DLHC
	Turbidity (NTU)	2.44	<0.10	<0.10	2.95	13.5
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	2.0	2.1	<1.0	<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	192	1.0	<1.0	188	256
	Alkalinity, Carbonate (as CaCO3) (mg/L)	3.2	<1.0	<1.0	11.6	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	195	1.0	<1.0	200	256 HTD
	Ammonia as N (mg/L)	0.0720	0.0073 RRV	0.0941	0.0748	0.171
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	0.171
	Chloride (Cl) (mg/L)	2.20	<0.50	<0.50	2.11	39.2
	Fluoride (F) (mg/L)	1.31	<0.020	<0.020	1.26	0.446
	Ion Balance (%)	98.3	9.9	0.0	96.6	106
	Nitrate (as N) (mg/L)	<0.0050	0.0067 RRV	<0.0050	<0.0050	0.0613
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	0.0015	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.142	0.083	0.103	0.123	0.249
	Total Nitrogen (mg/L)	0.142	0.090	0.103	0.125	0.310
	Orthophosphate-Dissolved (as P) (mg/L)	0.0089	<0.0010	<0.0010	0.0093	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)	0.0174	<0.0020		0.0178	0.0033
	Phosphorus (P)-Total (mg/L)	0.0194	<0.0020	<0.0020	0.0191	0.0054
	Sulfate (SO4) (mg/L)	70.5	<0.30	<0.30	71.5	135
	Anion Sum (meq/L)	5.50	<0.10	<0.10	5.60	9.04
	Cation Sum (meq/L)	5.41	<0.10	<0.10	5.41	9.62
	Cation - Anion Balance (%)	-0.9	-81.9	0.0	-1.7	3.1
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.54	<0.50		0.64	1.42
	Total Organic Carbon (mg/L)	0.53	<0.50	<0.50	0.62	1.52
Total Metals	Aluminum (Al)-Total (mg/L)			<0.0030		
	Antimony (Sb)-Total (mg/L)			<0.00010		
	Arsenic (As)-Total (mg/L)			<0.00010		
	Barium (Ba)-Total (mg/L)			<0.00010		
	Beryllium (Be)-Total (ug/L)			<0.020		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2150459-6	L2150459-7	L2150459-8	L2150459-9	L2150459-10
	Description	WG	WG	WG	WG	WG
	Sampled Date	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18
	Sampled Time	10:50	14:35	12:50	09:00	10:50
	Client ID	EV_MCGWD_WG_2018-08_NP	EV_GCGW_WG_2018-08_NP	EV_OCGW_WG_2018-08_FB-HG	EV_MCGWS_WG_2018-08_FB-HG	EV_MCGWD_WG_2018-08_FB-HG
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0			
	Conductivity (@ 25C) (uS/cm)	570	338			
	Hardness (as CaCO3) (mg/L)	230	222			
	pH (pH)	8.43	8.23			
	ORP (mV)	416	464			
	Total Suspended Solids (mg/L)	184 DLHC	33.3			
	Total Dissolved Solids (mg/L)	376 DLHC	287 DLHC			
	Turbidity (NTU)	155	11.8			
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	241	135			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	3.8	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	244 HTD	135			
	Ammonia as N (mg/L)	0.112	0.0301			
	Bromide (Br) (mg/L)	<0.050	<0.050			
	Chloride (Cl) (mg/L)	4.57	3.83			
	Fluoride (F) (mg/L)	1.06	0.578			
	Ion Balance (%)	108	117			
	Nitrate (as N) (mg/L)	0.131	0.0083			
	Nitrite (as N) (mg/L)	0.0036	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	0.524	0.121			
	Total Nitrogen (mg/L)	0.659	0.129			
	Orthophosphate-Dissolved (as P) (mg/L)	0.0051	<0.0010			
	Phosphorus (P)-Total Dissolved (mg/L)	0.0062	0.0023			
	Phosphorus (P)-Total (mg/L)	0.351	0.0176			
	Sulfate (SO4) (mg/L)	69.6	54.2			
	Anion Sum (meq/L)	6.53	3.97			
	Cation Sum (meq/L)	7.07	4.64			
	Cation - Anion Balance (%)	4.0	7.8			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.65	0.81			
	Total Organic Carbon (mg/L)	<5.0 DLM	2.33			
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2150459-1	L2150459-2	L2150459-3	L2150459-4	L2150459-5
Description	WG	WG	WG	WG	WG
Sampled Date	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18
Sampled Time	12:55	13:00	13:05	12:50	09:00
Client ID	EV_MC5GW_WG_2018-08_NP	EV_MC6GW_WG_2018-08_NP	EV_MC7GW_WG_2018-08_NP	EV_OCGW_WG_2018-08_NP	EV_MCGWS_WG_2018-08_NP
Grouping / **Analyte**					
WATER					
Total Metals					
Bismuth (Bi)-Total (mg/L)			<0.000050		
Boron (B)-Total (mg/L)			<0.010		
Cadmium (Cd)-Total (ug/L)			<0.0050		
Calcium (Ca)-Total (mg/L)			<0.050		
Chromium (Cr)-Total (mg/L)			<0.00010		
Cobalt (Co)-Total (ug/L)			<0.10		
Copper (Cu)-Total (mg/L)			<0.00050		
Iron (Fe)-Total (mg/L)			<0.010		
Lead (Pb)-Total (mg/L)			<0.000050		
Lithium (Li)-Total (mg/L)			<0.0010		
Magnesium (Mg)-Total (mg/L)			<0.10		
Manganese (Mn)-Total (mg/L)			<0.00010		
Mercury (Hg)-Total (ug/L)			<0.00050		
Molybdenum (Mo)-Total (mg/L)			<0.000050		
Nickel (Ni)-Total (mg/L)			<0.00050		
Potassium (K)-Total (mg/L)			<0.050		
Selenium (Se)-Total (ug/L)			<0.050		
Silicon (Si)-Total (mg/L)			<0.10		
Silver (Ag)-Total (mg/L)			<0.000010		
Sodium (Na)-Total (mg/L)			<0.050		
Strontium (Sr)-Total (mg/L)			<0.00020		
Thallium (Tl)-Total (mg/L)			<0.000010		
Tin (Sn)-Total (mg/L)			<0.00010		
Titanium (Ti)-Total (mg/L)			<0.010		
Uranium (U)-Total (mg/L)			<0.000010		
Vanadium (V)-Total (mg/L)			<0.00050		
Zinc (Zn)-Total (mg/L)			<0.0030		
Dissolved Metals					
Dissolved Mercury Filtration Location	FIELD	FIELD		FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	LAB	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0031	<0.0030		<0.0030	<0.0030
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010		<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00153	<0.00010		0.00145	0.00097
Barium (Ba)-Dissolved (mg/L)	0.0601	<0.00010		0.0605	0.0266
Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020		<0.020	<0.020
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050		<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	0.122	<0.010		0.121	0.026
Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050		<0.0050	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2150459-6	L2150459-7	L2150459-8	L2150459-9	L2150459-10
	Description	WG	WG	WG	WG	WG
	Sampled Date	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18
	Sampled Time	10:50	14:35	12:50	09:00	10:50
	Client ID	EV_MCGWD_WG_2018-08_NP	EV_GCGW_WG_2018-08_NP	EV_OCGW_WG_2018-08_FB-HG	EV_MCGWS_WG_2018-08_FB-HG	EV_MCGWD_WG_2018-08_FB-HG
Grouping	**Analyte**					
WATER						
Total Metals	Bismuth (Bi)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (ug/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (ug/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (ug/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (ug/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030			
	Antimony (Sb)-Dissolved (mg/L)	0.00014	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00064	0.00232			
	Barium (Ba)-Dissolved (mg/L)	0.0626	0.0748			
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	0.066	0.014			
	Cadmium (Cd)-Dissolved (ug/L)	0.0552	<0.0050			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2150459-1	L2150459-2	L2150459-3	L2150459-4	L2150459-5
Description	WG	WG	WG	WG	WG
Sampled Date	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18
Sampled Time	12:55	13:00	13:05	12:50	09:00
Client ID	EV_MC5GW_WG_2018-08_NP	EV_MC6GW_WG_2018-08_NP	EV_MC7GW_WG_2018-08_NP	EV_OCGW_WG_2018-08_NP	EV_MCGWS_WG_2018-08_NP
Grouping / **Analyte**					
WATER					
Dissolved Metals Calcium (Ca)-Dissolved (mg/L)	28.7	<0.050	<0.050	29.0	97.8
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010		<0.00010	<0.00010
Cobalt (Co)-Dissolved (ug/L)	0.13	<0.10		0.13	<0.10
Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050		<0.00050	<0.00050
Iron (Fe)-Dissolved (mg/L)	0.337	<0.010		0.340	1.60
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050		<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	0.0260	<0.0010		0.0264	0.0256
Magnesium (Mg)-Dissolved (mg/L)	20.0	<0.10	<0.0050	19.9	34.8
Manganese (Mn)-Dissolved (mg/L)	0.0904	<0.00010		0.0900	0.133
Mercury (Hg)-Dissolved (mg/L)					
Mercury (Hg)-Dissolved (ug/L)	<0.00050	<0.00050		<0.00050	<0.00050
Molybdenum (Mo)-Dissolved (mg/L)	0.0148	<0.000050		0.0149	0.00219
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050		<0.00050	<0.00050
Potassium (K)-Dissolved (mg/L)	1.73	<0.050	<0.050	1.75	1.87
Selenium (Se)-Dissolved (ug/L)	<0.050	<0.050		<0.050	1.31
Silicon (Si)-Dissolved (mg/L)	4.56	<0.050		4.52	5.21
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010		<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	51.9	<0.050	<0.050	51.9	39.6
Strontium (Sr)-Dissolved (mg/L)	0.405	<0.00020		0.412	0.312
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010		<0.000010	<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010		<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010		<0.010	<0.010
Uranium (U)-Dissolved (mg/L)	0.00110	<0.000010		0.00113	0.00165
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050		<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010		0.0020	<0.0010
Hydrocarbons EPH10-19 (mg/L)	<0.25	<0.25	<0.25	<0.25	
EPH (C10-C32) (mg/L)	<0.50	<0.50	<0.50	<0.50	
EPH19-32 (mg/L)	<0.25	<0.25	<0.25	<0.25	
TEH (C10-C30) (mg/L)	<0.25	<0.25	<0.25	<0.25	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2150459-6	L2150459-7	L2150459-8	L2150459-9	L2150459-10
	Description	WG	WG	WG	WG	WG
	Sampled Date	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18	20-AUG-18
	Sampled Time	10:50	14:35	12:50	09:00	10:50
	Client ID	EV_MCGWD_WG_2018-08_NP	EV_GCGW_WG_2018-08_NP	EV_OCGW_WG_2018-08_FB-HG	EV_MCGWS_WG_2018-08_FB-HG	EV_MCGWD_WG_2018-08_FB-HG
Grouping	**Analyte**					
WATER						
Dissolved Metals	Calcium (Ca)-Dissolved (mg/L)	50.9	60.4			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Dissolved (ug/L)	0.50	0.22			
	Copper (Cu)-Dissolved (mg/L)	0.00263	<0.00050			
	Iron (Fe)-Dissolved (mg/L)	<0.010	0.272			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	0.0115	0.0078			
	Magnesium (Mg)-Dissolved (mg/L)	25.0	17.3			
	Manganese (Mn)-Dissolved (mg/L)	0.317	0.0948			
	Mercury (Hg)-Dissolved (mg/L)		<0.0000050			
	Mercury (Hg)-Dissolved (ug/L)	<0.00050		<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)-Dissolved (mg/L)	0.0180	0.00251			
	Nickel (Ni)-Dissolved (mg/L)	0.00549	0.00064			
	Potassium (K)-Dissolved (mg/L)	1.58	0.786			
	Selenium (Se)-Dissolved (ug/L)	0.216	<0.050			
	Silicon (Si)-Dissolved (mg/L)	5.22	4.27			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	55.6	3.78			
	Strontium (Sr)-Dissolved (mg/L)	0.471	0.256			
	Thallium (Tl)-Dissolved (mg/L)	0.000068	0.000017			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.00399	0.00110			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	0.0107	0.0013			
Hydrocarbons	EPH10-19 (mg/L)					
	EPH (C10-C32) (mg/L)					
	EPH19-32 (mg/L)					
	TEH (C10-C30) (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Fluoride (F)	MS-B	L2150459-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2150459-3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2150459-3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2150459-3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2150459-1, -2, -4, -5, -6
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2150459-7
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2150459-1, -2, -4, -5, -6
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2150459-7
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2150459-1, -2, -4, -5, -6
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2150459-7
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2150459-1, -2, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2150459-1, -2, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2150459-7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2150459-1, -2, -4, -5, -6
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2150459-7

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample

Reference Information

pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL Water Colour (True) by Spectrometer APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

EPH(10-32)-CALC-CL Water Sum of EPH (10-32) Sum of EPH - Auto Calculated

The sum of EPH(C10-C19) and EPH(C19-C32)

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-CL Water Hardness APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-D-U-CVAF-VA Water Diss. Mercury in Water by CVAFS (Ultra) APHA 3030 B / EPA 1631 REV. E

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure may involve preliminary sample treatment by filtration (APHA 3030B) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-CL Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Reference Information

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-CL Water Phosphorus (P)-Total Dissolved APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TEH-BC-VA-CL Water EPH (C10-C19) & EPH (C19-C32) BCMOE EPH GCFID

Analysis is in accordance with BC MOE Lab Manual method "Extractable Petroleum Hydrocarbons in Water by GC/FID", v2.1, July 1999. Whole water samples are extracted with DCM prior to gas chromatography with flame ionization detection (GC-FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

TEH-WATER-VA-CL Water TEH (C10-C30) EPA 3510/8000-GC-FID

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180820

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4196068								
WG2862775-26 LCS								
Acidity (as CaCO3)			99.1		%		85-115	28-AUG-18
WG2862775-25 MB								
Acidity (as CaCO3)			1.5		mg/L		2	28-AUG-18
ALK-MAN-CL	**Water**							
Batch R4196096								
WG2863915-11 LCS								
Alkalinity, Total (as CaCO3)			107.6		%		85-115	29-AUG-18
WG2863915-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	29-AUG-18
BE-D-L-CCMS-VA	**Water**							
Batch R4182113								
WG2857372-2 LCS								
Beryllium (Be)-Dissolved			96.0		%		80-120	23-AUG-18
WG2857372-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	23-AUG-18
WG2857372-4 MS		**L2150459-6**						
Beryllium (Be)-Dissolved			97.5		%		70-130	23-AUG-18
Batch R4182600								
WG2857373-2 LCS								
Beryllium (Be)-Dissolved			97.6		%		80-120	24-AUG-18
WG2857373-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	24-AUG-18
BE-T-L-CCMS-VA	**Water**							
Batch R4182113								
WG2857841-2 LCS								
Beryllium (Be)-Total			97.9		%		80-120	23-AUG-18
WG2857841-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	23-AUG-18
BR-L-IC-N-CL	**Water**							
Batch R4180498								
WG2856901-18 LCS								
Bromide (Br)			105.0		%		85-115	31-AUG-18
WG2856901-34 LCS								
Bromide (Br)			105.0		%		85-115	31-AUG-18
WG2856901-38 LCS								
Bromide (Br)			104.4		%		85-115	31-AUG-18
WG2856901-17								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-CL	**Water**							
Batch R4180498								
WG2856901-17 MB								
Bromide (Br)			<0.050		mg/L		0.05	31-AUG-18
WG2856901-33 MB								
Bromide (Br)			<0.050		mg/L		0.05	31-AUG-18
WG2856901-37 MB								
Bromide (Br)			<0.050		mg/L		0.05	31-AUG-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4201619								
WG2868089-2 LCS								
Dissolved Organic Carbon			101.0		%		80-120	04-SEP-18
WG2868089-6 LCS								
Dissolved Organic Carbon			102.0		%		80-120	04-SEP-18
WG2868089-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-SEP-18
WG2868089-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-SEP-18
Batch R4201748								
WG2868145-6 LCS								
Dissolved Organic Carbon			85.8		%		80-120	04-SEP-18
WG2868145-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-SEP-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4201619								
WG2868089-2 LCS								
Total Organic Carbon			102.7		%		80-120	04-SEP-18
WG2868089-6 LCS								
Total Organic Carbon			100.7		%		80-120	04-SEP-18
WG2868089-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-SEP-18
WG2868089-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-SEP-18
Batch R4201748								
WG2868145-6 LCS								
Total Organic Carbon			85.1		%		80-120	04-SEP-18
WG2868145-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4207095								
WG2872191-2 LCS								
Total Organic Carbon			96.5		%		80-120	09-SEP-18
WG2872191-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	09-SEP-18
CL-IC-N-CL	**Water**							
Batch R4180498								
WG2856901-36 DUP		**L2150459-2**						
Chloride (Cl)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	21-AUG-18
WG2856901-40 DUP		**L2150459-1**						
Chloride (Cl)		2.20	2.15		mg/L	2.0	20	21-AUG-18
WG2856901-18 LCS								
Chloride (Cl)			101.2		%		90-110	20-AUG-18
WG2856901-34 LCS								
Chloride (Cl)			101.4		%		90-110	21-AUG-18
WG2856901-38 LCS								
Chloride (Cl)			101.8		%		90-110	21-AUG-18
WG2856901-17 MB								
Chloride (Cl)			<0.50		mg/L		0.5	20-AUG-18
WG2856901-33 MB								
Chloride (Cl)			<0.50		mg/L		0.5	21-AUG-18
WG2856901-37 MB								
Chloride (Cl)			<0.50		mg/L		0.5	21-AUG-18
WG2856901-35 MS		**L2150459-2**						
Chloride (Cl)			114.9		%		75-125	21-AUG-18
WG2856901-39 MS		**L2150459-1**						
Chloride (Cl)			92.1		%		75-125	21-AUG-18
COLOUR-TRUE-CL	**Water**							
Batch R4181179								
WG2856040-3 DUP		**L2150459-1**						
Colour, True		<5.0	<5.0	RPD-NA	CU	N/A	20	21-AUG-18
WG2856040-2 LCS								
Colour, True			101.9		%		85-115	21-AUG-18
WG2856040-1 MB								
Colour, True			<5.0		CU		5	21-AUG-18
EC-L-PCT-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-L-PCT-CL	**Water**							
Batch R4196096								
WG2863915-11 LCS								
Conductivity (@ 25C)			100.3		%		90-110	29-AUG-18
WG2863915-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	29-AUG-18
F-IC-N-CL	**Water**							
Batch R4180498								
WG2856901-36 DUP		**L2150459-2**						
Fluoride (F)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	21-AUG-18
WG2856901-40 DUP		**L2150459-1**						
Fluoride (F)		1.31	1.23		mg/L	6.6	20	21-AUG-18
WG2856901-18 LCS								
Fluoride (F)			102.0		%		90-110	21-AUG-18
WG2856901-34 LCS								
Fluoride (F)			104.9		%		90-110	21-AUG-18
WG2856901-38 LCS								
Fluoride (F)			107.1		%		90-110	21-AUG-18
WG2856901-17 MB								
Fluoride (F)			<0.020		mg/L		0.02	21-AUG-18
WG2856901-33 MB								
Fluoride (F)			<0.020		mg/L		0.02	21-AUG-18
WG2856901-37 MB								
Fluoride (F)			<0.020		mg/L		0.02	21-AUG-18
WG2856901-35 MS		**L2150459-2**						
Fluoride (F)			121.2		%		75-125	21-AUG-18
WG2856901-39 MS		**L2150459-1**						
Fluoride (F)			N/A	MS-B	%		-	21-AUG-18
HG-D-CVAA-VA	**Water**							
Batch R4180900								
WG2857334-10 LCS								
Mercury (Hg)-Dissolved			97.9		%		80-120	23-AUG-18
WG2857334-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	23-AUG-18
HG-D-U-CVAF-VA	**Water**							
Batch R4183217								
WG2857427-3 DUP		**L2150459-8**						
Mercury (Hg)-Dissolved		<0.00050	<0.00050	RPD-NA	ug/L	N/A	20	25-AUG-18
WG2857427-2 LCS								
Mercury (Hg)-Dissolved			109.4		%		80-120	25-AUG-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-U-CVAF-VA	**Water**							
Batch R4183217								
WG2859966-2 LCS								
Mercury (Hg)-Dissolved			109.4		%		80-120	25-AUG-18
WG2857427-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.00050		ug/L		0.0005	25-AUG-18
WG2859966-1 MB								
Mercury (Hg)-Dissolved			<0.00050		ug/L		0.0005	25-AUG-18
WG2857427-4 MS		**L2150459-6**						
Mercury (Hg)-Dissolved			94.8		%		70-130	25-AUG-18
HG-T-U-CVAF-VA	**Water**							
Batch R4182753								
WG2859043-2 LCS								
Mercury (Hg)-Total			114.4		%		80-120	24-AUG-18
WG2859043-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	24-AUG-18
MET-D-CCMS-CL	**Water**							
Batch R4194717								
WG2864243-2 LCS		**TMRM**						
Calcium (Ca)-Dissolved			93.6		%		80-120	29-AUG-18
Magnesium (Mg)-Dissolved			97.2		%		80-120	29-AUG-18
Potassium (K)-Dissolved			98.4		%		80-120	29-AUG-18
Sodium (Na)-Dissolved			93.8		%		80-120	29-AUG-18
WG2864243-6 LCS		**TMRM**						
Calcium (Ca)-Dissolved			96.7		%		80-120	29-AUG-18
Magnesium (Mg)-Dissolved			97.0		%		80-120	29-AUG-18
Potassium (K)-Dissolved			95.0		%		80-120	29-AUG-18
Sodium (Na)-Dissolved			95.5		%		80-120	29-AUG-18
WG2864243-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	29-AUG-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	29-AUG-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	29-AUG-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	29-AUG-18
WG2864243-5 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	29-AUG-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	29-AUG-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	29-AUG-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	29-AUG-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4182113								
WG2857372-2 LCS								
Aluminum (Al)-Dissolved			104.5		%		80-120	23-AUG-18
Antimony (Sb)-Dissolved			97.6		%		80-120	23-AUG-18
Arsenic (As)-Dissolved			99.9		%		80-120	23-AUG-18
Barium (Ba)-Dissolved			97.5		%		80-120	23-AUG-18
Bismuth (Bi)-Dissolved			95.5		%		80-120	23-AUG-18
Boron (B)-Dissolved			90.8		%		80-120	23-AUG-18
Cadmium (Cd)-Dissolved			98.1		%		80-120	23-AUG-18
Calcium (Ca)-Dissolved			94.6		%		80-120	23-AUG-18
Chromium (Cr)-Dissolved			98.4		%		80-120	23-AUG-18
Cobalt (Co)-Dissolved			97.2		%		80-120	23-AUG-18
Copper (Cu)-Dissolved			95.2		%		80-120	23-AUG-18
Iron (Fe)-Dissolved			97.5		%		80-120	23-AUG-18
Lead (Pb)-Dissolved			98.2		%		80-120	23-AUG-18
Lithium (Li)-Dissolved			95.0		%		80-120	23-AUG-18
Magnesium (Mg)-Dissolved			101.1		%		80-120	23-AUG-18
Manganese (Mn)-Dissolved			98.4		%		80-120	23-AUG-18
Molybdenum (Mo)-Dissolved			98.3		%		80-120	23-AUG-18
Nickel (Ni)-Dissolved			97.3		%		80-120	23-AUG-18
Potassium (K)-Dissolved			102.2		%		80-120	23-AUG-18
Selenium (Se)-Dissolved			95.6		%		80-120	23-AUG-18
Silicon (Si)-Dissolved			100.9		%		60-140	23-AUG-18
Silver (Ag)-Dissolved			100.0		%		80-120	23-AUG-18
Sodium (Na)-Dissolved			99.8		%		80-120	23-AUG-18
Strontium (Sr)-Dissolved			95.2		%		80-120	23-AUG-18
Thallium (Tl)-Dissolved			95.8		%		80-120	23-AUG-18
Tin (Sn)-Dissolved			99.3		%		80-120	23-AUG-18
Titanium (Ti)-Dissolved			99.8		%		80-120	23-AUG-18
Uranium (U)-Dissolved			97.1		%		80-120	23-AUG-18
Vanadium (V)-Dissolved			100.8		%		80-120	23-AUG-18
Zinc (Zn)-Dissolved			91.6		%		80-120	23-AUG-18
WG2857372-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	23-AUG-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	23-AUG-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	23-AUG-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4182113								
WG2857372-1 MB		**NP**						
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	23-AUG-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	23-AUG-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	23-AUG-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	23-AUG-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-AUG-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	23-AUG-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	23-AUG-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	23-AUG-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	23-AUG-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	23-AUG-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	23-AUG-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-AUG-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	23-AUG-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	23-AUG-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	23-AUG-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-AUG-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	23-AUG-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	23-AUG-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	23-AUG-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-AUG-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	23-AUG-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	23-AUG-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	23-AUG-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	23-AUG-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	23-AUG-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	23-AUG-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	23-AUG-18
WG2857372-4 MS		**L2150459-6**						
Aluminum (Al)-Dissolved			102.7		%		70-130	23-AUG-18
Antimony (Sb)-Dissolved			104.3		%		70-130	23-AUG-18
Arsenic (As)-Dissolved			105.1		%		70-130	23-AUG-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	23-AUG-18
Bismuth (Bi)-Dissolved			85.0		%		70-130	23-AUG-18
Boron (B)-Dissolved			94.4		%		70-130	23-AUG-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch	**R4182113**							
WG2857372-4	**MS**	**L2150459-6**						
Cadmium (Cd)-Dissolved			102.8		%		70-130	23-AUG-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	23-AUG-18
Chromium (Cr)-Dissolved			100.3		%		70-130	23-AUG-18
Cobalt (Co)-Dissolved			96.8		%		70-130	23-AUG-18
Copper (Cu)-Dissolved			92.3		%		70-130	23-AUG-18
Iron (Fe)-Dissolved			94.8		%		70-130	23-AUG-18
Lead (Pb)-Dissolved			94.6		%		70-130	23-AUG-18
Lithium (Li)-Dissolved			94.5		%		70-130	23-AUG-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	23-AUG-18
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	23-AUG-18
Molybdenum (Mo)-Dissolved			98.9		%		70-130	23-AUG-18
Nickel (Ni)-Dissolved			95.0		%		70-130	23-AUG-18
Potassium (K)-Dissolved			101.1		%		70-130	23-AUG-18
Selenium (Se)-Dissolved			99.3		%		70-130	23-AUG-18
Silicon (Si)-Dissolved			87.9		%		70-130	23-AUG-18
Silver (Ag)-Dissolved			73.8		%		70-130	23-AUG-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	23-AUG-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	23-AUG-18
Thallium (Tl)-Dissolved			92.6		%		70-130	23-AUG-18
Tin (Sn)-Dissolved			102.7		%		70-130	23-AUG-18
Titanium (Ti)-Dissolved			97.2		%		70-130	23-AUG-18
Uranium (U)-Dissolved			93.8		%		70-130	23-AUG-18
Vanadium (V)-Dissolved			101.8		%		70-130	23-AUG-18
Zinc (Zn)-Dissolved			94.5		%		70-130	23-AUG-18
Batch	**R4182289**							
WG2859119-2	**LCS**							
Aluminum (Al)-Dissolved			96.2		%		80-120	24-AUG-18
Antimony (Sb)-Dissolved			93.6		%		80-120	24-AUG-18
Arsenic (As)-Dissolved			95.5		%		80-120	24-AUG-18
Barium (Ba)-Dissolved			94.3		%		80-120	24-AUG-18
Bismuth (Bi)-Dissolved			92.5		%		80-120	24-AUG-18
Boron (B)-Dissolved			89.2		%		80-120	24-AUG-18
Cadmium (Cd)-Dissolved			93.8		%		80-120	24-AUG-18
Calcium (Ca)-Dissolved			92.1		%		80-120	24-AUG-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4182289								
WG2859119-2 LCS								
Chromium (Cr)-Dissolved			95.5		%		80-120	24-AUG-18
Cobalt (Co)-Dissolved			94.7		%		80-120	24-AUG-18
Copper (Cu)-Dissolved			94.0		%		80-120	24-AUG-18
Iron (Fe)-Dissolved			96.0		%		80-120	24-AUG-18
Lead (Pb)-Dissolved			95.4		%		80-120	24-AUG-18
Lithium (Li)-Dissolved			94.1		%		80-120	24-AUG-18
Magnesium (Mg)-Dissolved			95.0		%		80-120	24-AUG-18
Manganese (Mn)-Dissolved			97.3		%		80-120	24-AUG-18
Molybdenum (Mo)-Dissolved			93.8		%		80-120	24-AUG-18
Nickel (Ni)-Dissolved			95.5		%		80-120	24-AUG-18
Potassium (K)-Dissolved			94.6		%		80-120	24-AUG-18
Selenium (Se)-Dissolved			91.5		%		80-120	24-AUG-18
Silicon (Si)-Dissolved			92.4		%		60-140	24-AUG-18
Silver (Ag)-Dissolved			91.8		%		80-120	24-AUG-18
Sodium (Na)-Dissolved			99.8		%		80-120	24-AUG-18
Strontium (Sr)-Dissolved			95.9		%		80-120	24-AUG-18
Thallium (Tl)-Dissolved			93.3		%		80-120	24-AUG-18
Tin (Sn)-Dissolved			95.0		%		80-120	24-AUG-18
Titanium (Ti)-Dissolved			91.4		%		80-120	24-AUG-18
Uranium (U)-Dissolved			98.3		%		80-120	24-AUG-18
Vanadium (V)-Dissolved			96.5		%		80-120	24-AUG-18
Zinc (Zn)-Dissolved			88.1		%		80-120	24-AUG-18
WG2859119-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	24-AUG-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	24-AUG-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	24-AUG-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-AUG-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	24-AUG-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4182289								
WG2859119-1 MB		**NP**						
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	24-AUG-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	24-AUG-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-AUG-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-AUG-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	24-AUG-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	24-AUG-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-AUG-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	24-AUG-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	24-AUG-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	24-AUG-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	24-AUG-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	24-AUG-18
WG2859119-4 MS		**L2150459-2**						
Aluminum (Al)-Dissolved			95.9		%		70-130	24-AUG-18
Antimony (Sb)-Dissolved			90.6		%		70-130	24-AUG-18
Arsenic (As)-Dissolved			96.3		%		70-130	24-AUG-18
Barium (Ba)-Dissolved			95.0		%		70-130	24-AUG-18
Bismuth (Bi)-Dissolved			93.0		%		70-130	24-AUG-18
Boron (B)-Dissolved			88.9		%		70-130	24-AUG-18
Cadmium (Cd)-Dissolved			96.3		%		70-130	24-AUG-18
Calcium (Ca)-Dissolved			90.6		%		70-130	24-AUG-18
Chromium (Cr)-Dissolved			96.0		%		70-130	24-AUG-18
Cobalt (Co)-Dissolved			97.2		%		70-130	24-AUG-18
Copper (Cu)-Dissolved			97.8		%		70-130	24-AUG-18
Iron (Fe)-Dissolved			93.4		%		70-130	24-AUG-18
Lead (Pb)-Dissolved			97.0		%		70-130	24-AUG-18
Lithium (Li)-Dissolved			97.6		%		70-130	24-AUG-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4182289								
WG2859119-4 MS		**L2150459-2**						
Magnesium (Mg)-Dissolved			93.5		%		70-130	24-AUG-18
Manganese (Mn)-Dissolved			93.0		%		70-130	24-AUG-18
Molybdenum (Mo)-Dissolved			88.9		%		70-130	24-AUG-18
Nickel (Ni)-Dissolved			97.1		%		70-130	24-AUG-18
Potassium (K)-Dissolved			93.4		%		70-130	24-AUG-18
Selenium (Se)-Dissolved			95.1		%		70-130	24-AUG-18
Silicon (Si)-Dissolved			92.9		%		70-130	24-AUG-18
Silver (Ag)-Dissolved			91.3		%		70-130	24-AUG-18
Sodium (Na)-Dissolved			107.1		%		70-130	24-AUG-18
Strontium (Sr)-Dissolved			91.0		%		70-130	24-AUG-18
Thallium (Tl)-Dissolved			94.7		%		70-130	24-AUG-18
Tin (Sn)-Dissolved			92.1		%		70-130	24-AUG-18
Titanium (Ti)-Dissolved			91.9		%		70-130	24-AUG-18
Uranium (U)-Dissolved			98.3		%		70-130	24-AUG-18
Vanadium (V)-Dissolved			95.2		%		70-130	24-AUG-18
Zinc (Zn)-Dissolved			91.8		%		70-130	24-AUG-18
Batch R4182600								
WG2857373-2 LCS								
Aluminum (Al)-Dissolved			104.1		%		80-120	24-AUG-18
Antimony (Sb)-Dissolved			96.9		%		80-120	24-AUG-18
Arsenic (As)-Dissolved			97.3		%		80-120	24-AUG-18
Barium (Ba)-Dissolved			99.4		%		80-120	24-AUG-18
Bismuth (Bi)-Dissolved			97.0		%		80-120	24-AUG-18
Boron (B)-Dissolved			97.3		%		80-120	24-AUG-18
Cadmium (Cd)-Dissolved			98.1		%		80-120	24-AUG-18
Calcium (Ca)-Dissolved			95.8		%		80-120	24-AUG-18
Chromium (Cr)-Dissolved			92.4		%		80-120	24-AUG-18
Cobalt (Co)-Dissolved			97.7		%		80-120	24-AUG-18
Copper (Cu)-Dissolved			94.1		%		80-120	24-AUG-18
Iron (Fe)-Dissolved			98.0		%		80-120	24-AUG-18
Lead (Pb)-Dissolved			97.0		%		80-120	24-AUG-18
Lithium (Li)-Dissolved			99.4		%		80-120	24-AUG-18
Magnesium (Mg)-Dissolved			93.7		%		80-120	24-AUG-18
Manganese (Mn)-Dissolved			97.1		%		80-120	24-AUG-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4182600								
WG2857373-2 LCS								
Molybdenum (Mo)-Dissolved			99.0		%		80-120	24-AUG-18
Nickel (Ni)-Dissolved			99.7		%		80-120	24-AUG-18
Potassium (K)-Dissolved			99.1		%		80-120	24-AUG-18
Selenium (Se)-Dissolved			99.2		%		80-120	24-AUG-18
Silicon (Si)-Dissolved			100.5		%		60-140	24-AUG-18
Silver (Ag)-Dissolved			101.5		%		80-120	24-AUG-18
Sodium (Na)-Dissolved			97.6		%		80-120	24-AUG-18
Strontium (Sr)-Dissolved			98.3		%		80-120	24-AUG-18
Thallium (Tl)-Dissolved			96.7		%		80-120	24-AUG-18
Tin (Sn)-Dissolved			97.4		%		80-120	24-AUG-18
Titanium (Ti)-Dissolved			99.9		%		80-120	24-AUG-18
Uranium (U)-Dissolved			96.9		%		80-120	24-AUG-18
Vanadium (V)-Dissolved			99.2		%		80-120	24-AUG-18
Zinc (Zn)-Dissolved			93.9		%		80-120	24-AUG-18
WG2857373-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	24-AUG-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	24-AUG-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	24-AUG-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-AUG-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	24-AUG-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	24-AUG-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	24-AUG-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-AUG-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-AUG-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4182600								
WG2857373-1 MB		**NP**						
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	24-AUG-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	24-AUG-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-AUG-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	24-AUG-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	24-AUG-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	24-AUG-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	24-AUG-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	24-AUG-18
MET-T-CCMS-VA	**Water**							
Batch R4182113								
WG2857841-2 LCS								
Aluminum (Al)-Total			104.7		%		80-120	23-AUG-18
Antimony (Sb)-Total			102.3		%		80-120	23-AUG-18
Arsenic (As)-Total			100.1		%		80-120	23-AUG-18
Barium (Ba)-Total			97.8		%		80-120	23-AUG-18
Bismuth (Bi)-Total			95.1		%		80-120	23-AUG-18
Boron (B)-Total			94.8		%		80-120	23-AUG-18
Cadmium (Cd)-Total			99.2		%		80-120	23-AUG-18
Calcium (Ca)-Total			94.4		%		80-120	23-AUG-18
Chromium (Cr)-Total			101.6		%		80-120	23-AUG-18
Cobalt (Co)-Total			99.4		%		80-120	23-AUG-18
Copper (Cu)-Total			97.7		%		80-120	23-AUG-18
Iron (Fe)-Total			97.3		%		80-120	23-AUG-18
Lead (Pb)-Total			97.3		%		80-120	23-AUG-18
Lithium (Li)-Total			95.6		%		80-120	23-AUG-18
Magnesium (Mg)-Total			102.8		%		80-120	23-AUG-18
Manganese (Mn)-Total			104.4		%		80-120	23-AUG-18
Molybdenum (Mo)-Total			97.8		%		80-120	23-AUG-18
Nickel (Ni)-Total			99.6		%		80-120	23-AUG-18
Potassium (K)-Total			106.6		%		80-120	23-AUG-18
Selenium (Se)-Total			95.1		%		80-120	23-AUG-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4182113								
WG2857841-2 LCS								
Silicon (Si)-Total			101.8		%		80-120	23-AUG-18
Silver (Ag)-Total			97.8		%		80-120	23-AUG-18
Sodium (Na)-Total			103.2		%		80-120	23-AUG-18
Strontium (Sr)-Total			94.0		%		80-120	23-AUG-18
Thallium (Tl)-Total			97.4		%		80-120	23-AUG-18
Tin (Sn)-Total			99.0		%		80-120	23-AUG-18
Titanium (Ti)-Total			96.9		%		80-120	23-AUG-18
Uranium (U)-Total			95.4		%		80-120	23-AUG-18
Vanadium (V)-Total			102.1		%		80-120	23-AUG-18
Zinc (Zn)-Total			97.2		%		80-120	23-AUG-18
WG2857841-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	23-AUG-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	23-AUG-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	23-AUG-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	23-AUG-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	23-AUG-18
Boron (B)-Total			<0.010		mg/L		0.01	23-AUG-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	23-AUG-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	23-AUG-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	23-AUG-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	23-AUG-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	23-AUG-18
Iron (Fe)-Total			<0.010		mg/L		0.01	23-AUG-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	23-AUG-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	23-AUG-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	23-AUG-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	23-AUG-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	23-AUG-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	23-AUG-18
Potassium (K)-Total			<0.050		mg/L		0.05	23-AUG-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	23-AUG-18
Silicon (Si)-Total			<0.10		mg/L		0.1	23-AUG-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	23-AUG-18
Sodium (Na)-Total			<0.050		mg/L		0.05	23-AUG-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4182113								
WG2857841-1 MB								
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	23-AUG-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	23-AUG-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	23-AUG-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	23-AUG-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	23-AUG-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	23-AUG-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	23-AUG-18
NH3-L-F-CL	**Water**							
Batch R4196428								
WG2866556-14 LCS								
Ammonia as N			103.2		%		85-115	01-SEP-18
WG2866556-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	01-SEP-18
NO2-L-IC-N-CL	**Water**							
Batch R4180498								
WG2856901-36 DUP		**L2150459-2**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	21-AUG-18
WG2856901-40 DUP		**L2150459-1**						
Nitrite (as N)		<0.0010	0.0010	RPD-NA	mg/L	N/A	20	21-AUG-18
WG2856901-18 LCS								
Nitrite (as N)			102.9		%		90-110	21-AUG-18
WG2856901-34 LCS								
Nitrite (as N)			105.1		%		90-110	21-AUG-18
WG2856901-38 LCS								
Nitrite (as N)			104.5		%		90-110	21-AUG-18
WG2856901-17 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	21-AUG-18
WG2856901-33 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	21-AUG-18
WG2856901-37 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	21-AUG-18
WG2856901-35 MS		**L2150459-2**						
Nitrite (as N)			118.8		%		75-125	21-AUG-18
WG2856901-39 MS		**L2150459-1**						
Nitrite (as N)			92.9		%		75-125	21-AUG-18
NO3-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4180498								
WG2856901-36 DUP		**L2150459-2**						
Nitrate (as N)		0.0067	0.0066		mg/L	1.5	20	21-AUG-18
WG2856901-40 DUP		**L2150459-1**						
Nitrate (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	21-AUG-18
WG2856901-18 LCS								
Nitrate (as N)			102.6		%		90-110	21-AUG-18
WG2856901-34 LCS								
Nitrate (as N)			108.0		%		90-110	21-AUG-18
WG2856901-38 LCS								
Nitrate (as N)			110.0		%		90-110	21-AUG-18
WG2856901-17 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	21-AUG-18
WG2856901-33 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	21-AUG-18
WG2856901-37 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	21-AUG-18
WG2856901-35 MS		**L2150459-2**						
Nitrate (as N)			114.9		%		75-125	21-AUG-18
WG2856901-39 MS		**L2150459-1**						
Nitrate (as N)			93.4		%		75-125	21-AUG-18
ORP-CL	**Water**							
Batch R4204704								
WG2870354-15 CRM		**CL-ORP**						
ORP			218		mV		210-230	06-SEP-18
WG2870354-17 CRM		**CL-ORP**						
ORP			221		mV		210-230	06-SEP-18
P-T-L-COL-CL	**Water**							
Batch R4189058								
WG2862234-7 DUP		**L2150459-1**						
Phosphorus (P)-Total		0.0194	0.0190		mg/L	2.4	20	28-AUG-18
WG2862234-6 LCS								
Phosphorus (P)-Total			107.6		%		80-120	28-AUG-18
WG2862234-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	28-AUG-18
WG2862234-8 MS		**L2150459-1**						
Phosphorus (P)-Total			99.3		%		70-130	28-AUG-18
P-TD-L-COL-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-TD-L-COL-CL	**Water**							
Batch R4189058								
WG2862234-7 DUP		**L2150459-1**						
Phosphorus (P)-Total	Dissolved	0.0174	0.0167		mg/L	3.8	20	28-AUG-18
WG2862234-6 LCS								
Phosphorus (P)-Total	Dissolved		107.6		%		80-120	28-AUG-18
WG2862234-5 MB								
Phosphorus (P)-Total	Dissolved		<0.0020		mg/L		0.002	28-AUG-18
WG2862234-8 MS		**L2150459-1**						
Phosphorus (P)-Total	Dissolved		92.9		%		70-130	28-AUG-18
PH-CL	**Water**							
Batch R4196096								
WG2863915-11 LCS								
pH			7.03		pH		6.9-7.1	29-AUG-18
PO4-DO-L-COL-CL	**Water**							
Batch R4181287								
WG2856031-42 LCS								
Orthophosphate-Dissolved (as P)			92.8		%		80-120	21-AUG-18
WG2856031-41 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	21-AUG-18
SO4-IC-N-CL	**Water**							
Batch R4180498								
WG2856901-36 DUP		**L2150459-2**						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	21-AUG-18
WG2856901-40 DUP		**L2150459-1**						
Sulfate (SO4)		70.5	71.0		mg/L	0.7	20	21-AUG-18
WG2856901-18 LCS								
Sulfate (SO4)			99.0		%		90-110	21-AUG-18
WG2856901-34 LCS								
Sulfate (SO4)			99.5		%		90-110	21-AUG-18
WG2856901-38 LCS								
Sulfate (SO4)			100.9		%		90-110	21-AUG-18
WG2856901-17 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	21-AUG-18
WG2856901-33 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	21-AUG-18
WG2856901-37 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	21-AUG-18
WG2856901-35 MS		**L2150459-2**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-CL	**Water**							
Batch R4180498								
WG2856901-35 MS		**L2150459-2**						
Sulfate (SO4)			111.8		%		75-125	21-AUG-18
WG2856901-39 MS		**L2150459-1**						
Sulfate (SO4)			87.8		%		75-125	21-AUG-18
SOLIDS-TDS-CL	**Water**							
Batch R4183086								
WG2858955-5 LCS								
Total Dissolved Solids			96.7		%		85-115	24-AUG-18
WG2858955-4 MB								
Total Dissolved Solids			<10		mg/L		10	24-AUG-18
Batch R4188828								
WG2860555-3 DUP		**L2150459-6**						
Total Dissolved Solids		376	376		mg/L	0.0	20	27-AUG-18
WG2860555-2 LCS								
Total Dissolved Solids			100.3		%		85-115	27-AUG-18
WG2860555-1 MB								
Total Dissolved Solids			<10		mg/L		10	27-AUG-18
TEH-BC-VA-CL	**Water**							
Batch R4184990								
WG2859948-2 LCS								
EPH10-19			93.2		%		50-150	24-AUG-18
EPH19-32			98.2		%		50-150	24-AUG-18
WG2859948-1 MB								
EPH10-19			<0.25		mg/L		0.25	24-AUG-18
EPH19-32			<0.25		mg/L		0.25	24-AUG-18
TEH-WATER-VA-CL	**Water**							
Batch R4184990								
WG2859948-2 LCS								
TEH (C10-C30)			93.9		%		50-150	24-AUG-18
WG2859948-1 MB								
TEH (C10-C30)			<0.25		mg/L		0.25	24-AUG-18
TKN-L-F-CL	**Water**							
Batch R4199947								
WG2867528-6 LCS								
Total Kjeldahl Nitrogen			118.1		%		75-125	03-SEP-18
WG2867528-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	03-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-L-CL	**Water**							
Batch R4184528								
WG2860212-2 LCS								
Total Suspended Solids			93.1		%		85-115	26-AUG-18
WG2860212-5 LCS								
Total Suspended Solids			96.2		%		85-115	26-AUG-18
WG2860212-1 MB								
Total Suspended Solids			<1.0		mg/L		1	26-AUG-18
WG2860212-4 MB								
Total Suspended Solids			<1.0		mg/L		1	26-AUG-18
TURBIDITY-CL	**Water**							
Batch R4181448								
WG2857757-9 DUP		**L2150459-2**						
Turbidity		<0.10	<0.10	RPD-NA	NTU	N/A	15	23-AUG-18
WG2857757-5 LCS								
Turbidity			98.0		%		85-115	23-AUG-18
WG2857757-7 LCS								
Turbidity			97.5		%		85-115	23-AUG-18
WG2857757-6 MB								
Turbidity			<0.10		NTU		0.1	23-AUG-18
WG2857757-8 MB								
Turbidity			<0.10		NTU		0.1	23-AUG-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	20-AUG-18 12:55	06-SEP-18 16:37	0.25	412	hours	EHTR-FM
	2	20-AUG-18 13:00	06-SEP-18 16:37	0.25	412	hours	EHTR-FM
	3	20-AUG-18 13:05	06-SEP-18 16:37	0.25	412	hours	EHTR-FM
	4	20-AUG-18 12:50	06-SEP-18 16:37	0.25	412	hours	EHTR-FM
	5	20-AUG-18 09:00	06-SEP-18 16:37	0.25	416	hours	EHTR-FM
	6	20-AUG-18 10:50	06-SEP-18 16:37	0.25	414	hours	EHTR-FM
	7	20-AUG-18 14:35	06-SEP-18 16:37	0.25	410	hours	EHTR-FM
pH							
	1	20-AUG-18 12:55	29-AUG-18 12:00	0.25	215	hours	EHTR-FM
	2	20-AUG-18 13:00	29-AUG-18 12:00	0.25	215	hours	EHTR-FM
	3	20-AUG-18 13:05	29-AUG-18 12:00	0.25	215	hours	EHTR-FM
	4	20-AUG-18 12:50	29-AUG-18 12:00	0.25	215	hours	EHTR-FM
	5	20-AUG-18 09:00	29-AUG-18 12:00	0.25	219	hours	EHTR-FM
	6	20-AUG-18 10:50	29-AUG-18 12:00	0.25	217	hours	EHTR-FM
	7	20-AUG-18 14:35	29-AUG-18 12:00	0.25	213	hours	EHTR-FM
Anions and Nutrients							
Alkalinity (Species) by Manual Titration							
	5	20-AUG-18 09:00	10-SEP-18 12:00	14	21	days	EHT
	6	20-AUG-18 10:50	10-SEP-18 12:00	14	21	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2150459 were received on 21-AUG-18 09:00.

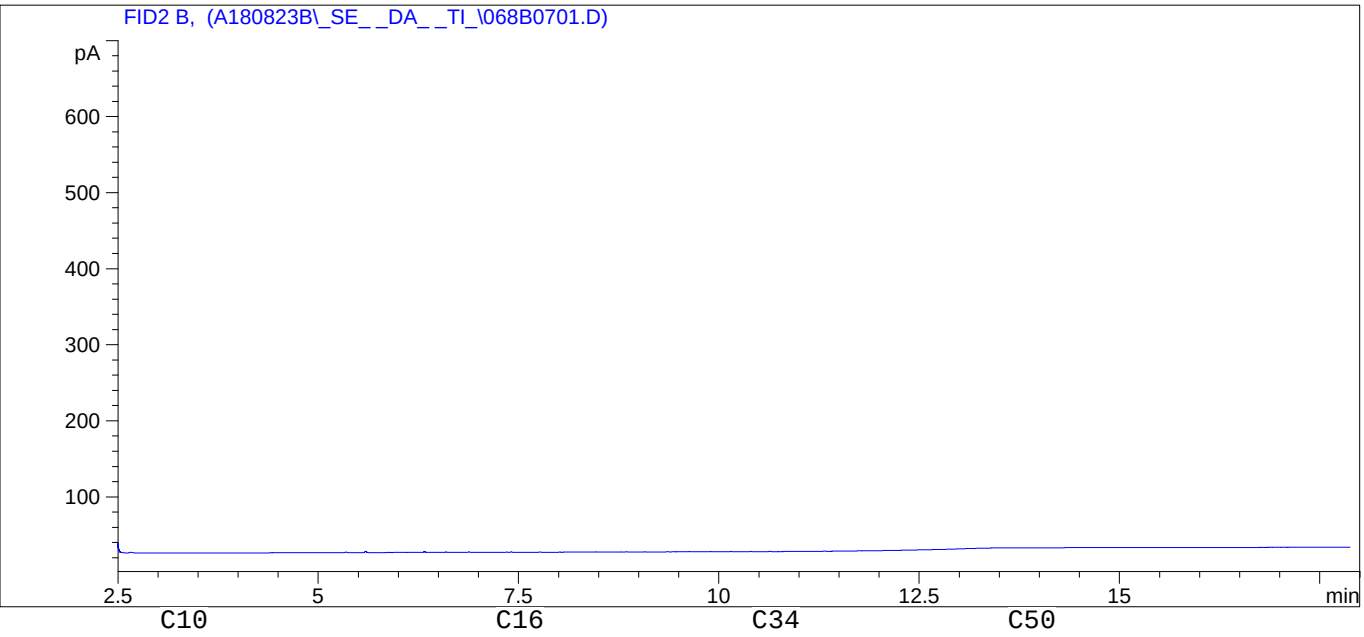
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

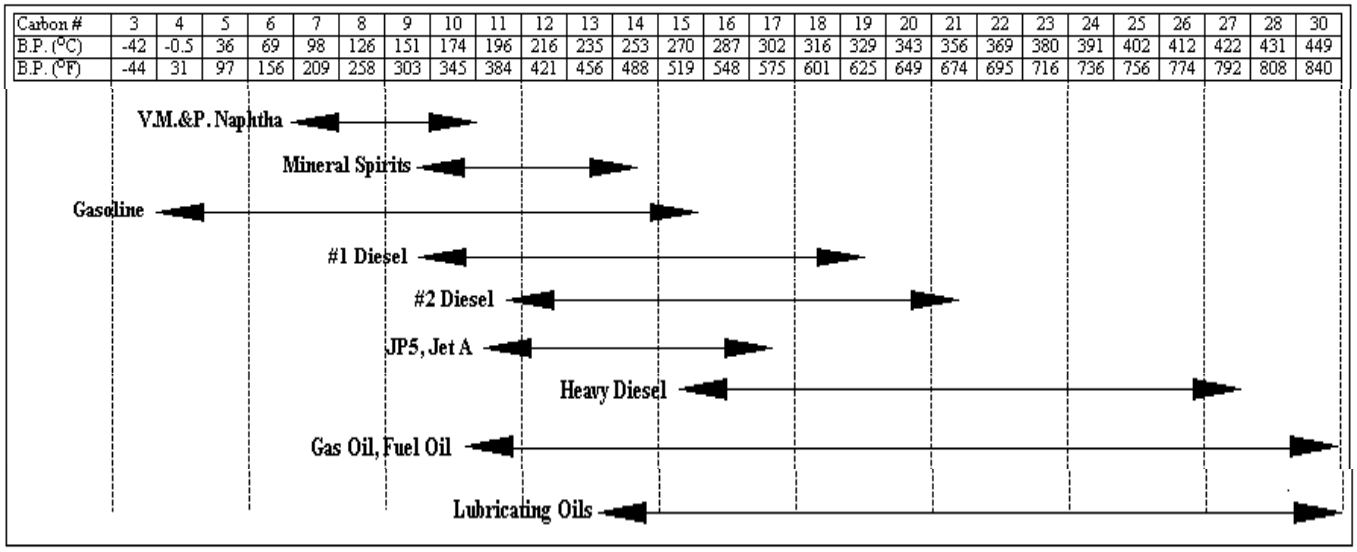
Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Client ID: EV_MC5GW_WG_2018-08_NP

Sample ID: L2150459-1 V4VA
Injection Date: 8/24/2018
Injection Time: 1:54:58 PM
Instrument ID: HP9
Operator:



Boiling Point Distribution Range for Petroleum Based Fuel Products



Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Summed Peaks Report

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Final Summed Peaks Report

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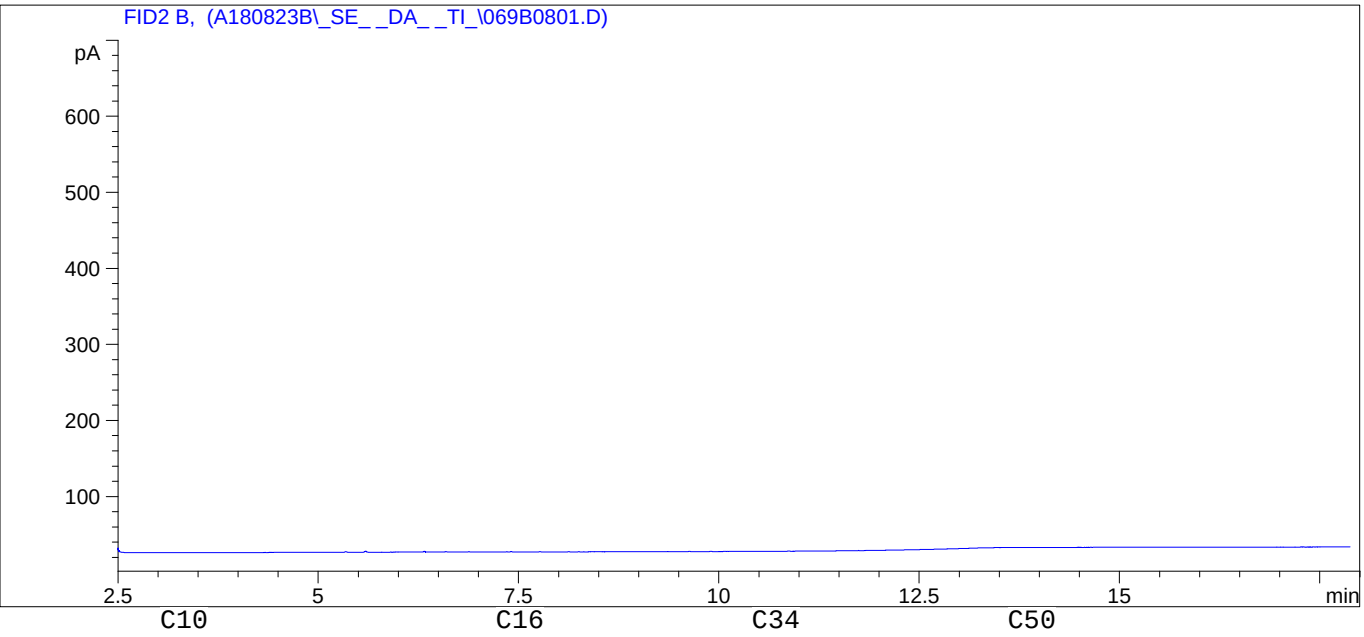
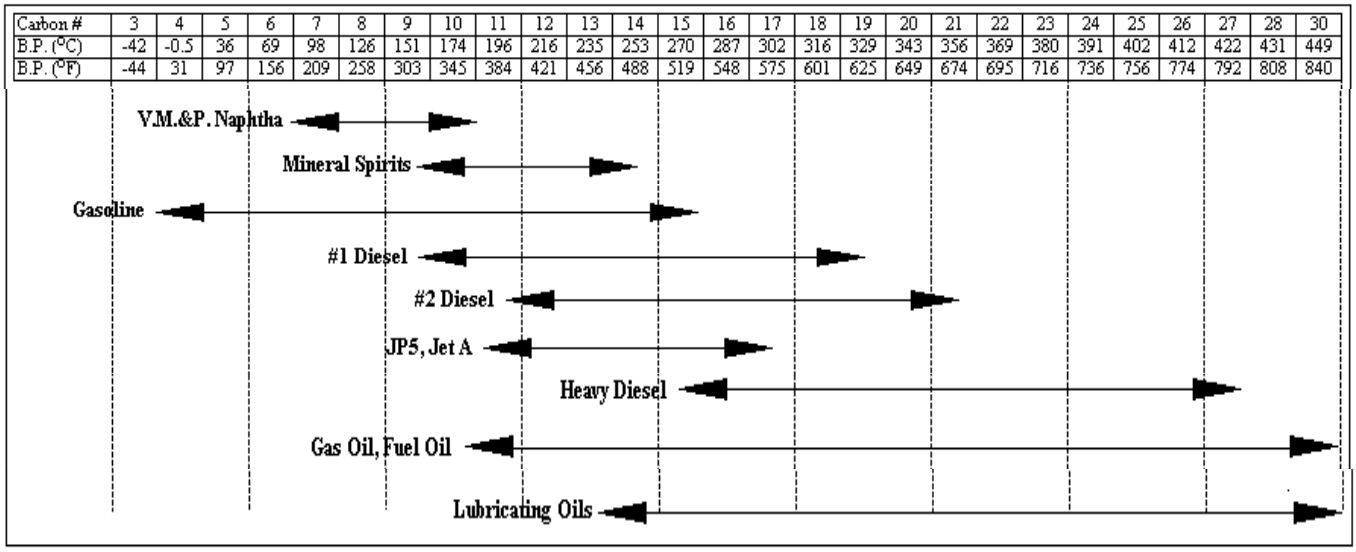
Client ID: EV_MC6GW_WG_2018-08_NP

Sample ID: L2150459-2 V4VA
Injection Date: 8/24/2018
Injection Time: 2:26:58 PM
Instrument ID: HP9
Operator:



Boiling Point Distribution Range for Petroleum Based Fuel Products



Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Summed Peaks Report

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Final Summed Peaks Report

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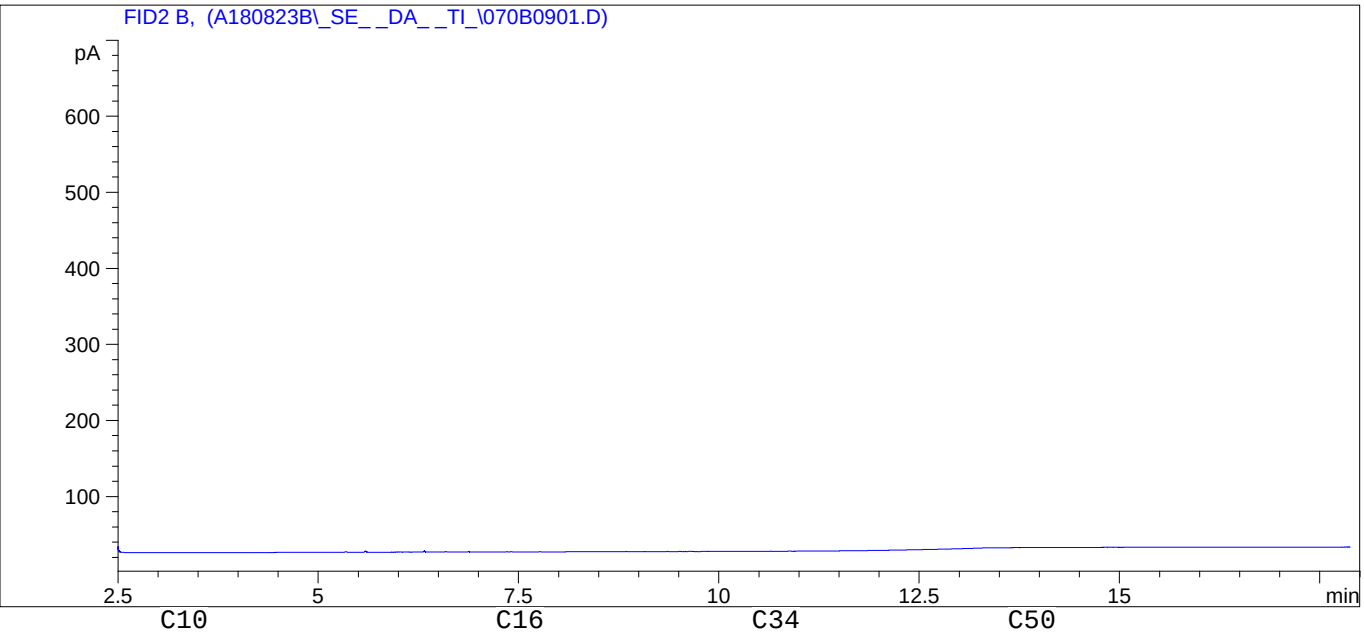
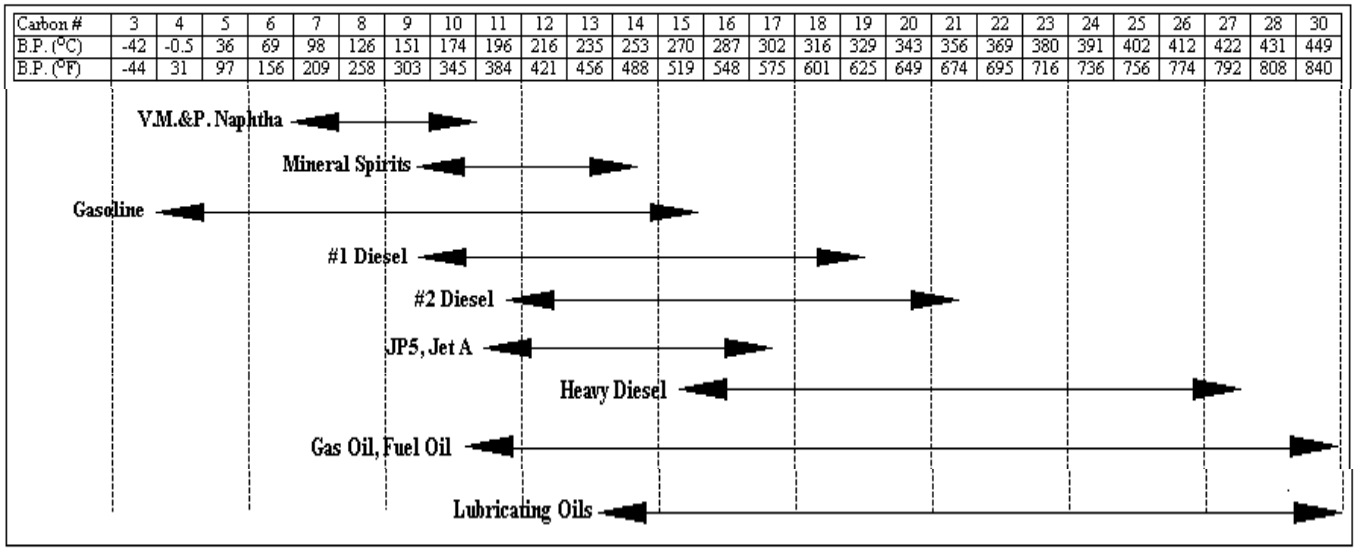
Client ID: EV_MC7GW_WG_2018-08_NP

Sample ID: L2150459-3 V4VA
Injection Date: 8/24/2018
Injection Time: 2:59:31 PM
Instrument ID: HP9
Operator:



Boiling Point Distribution Range for Petroleum Based Fuel Products



Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Summed Peaks Report

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Final Summed Peaks Report

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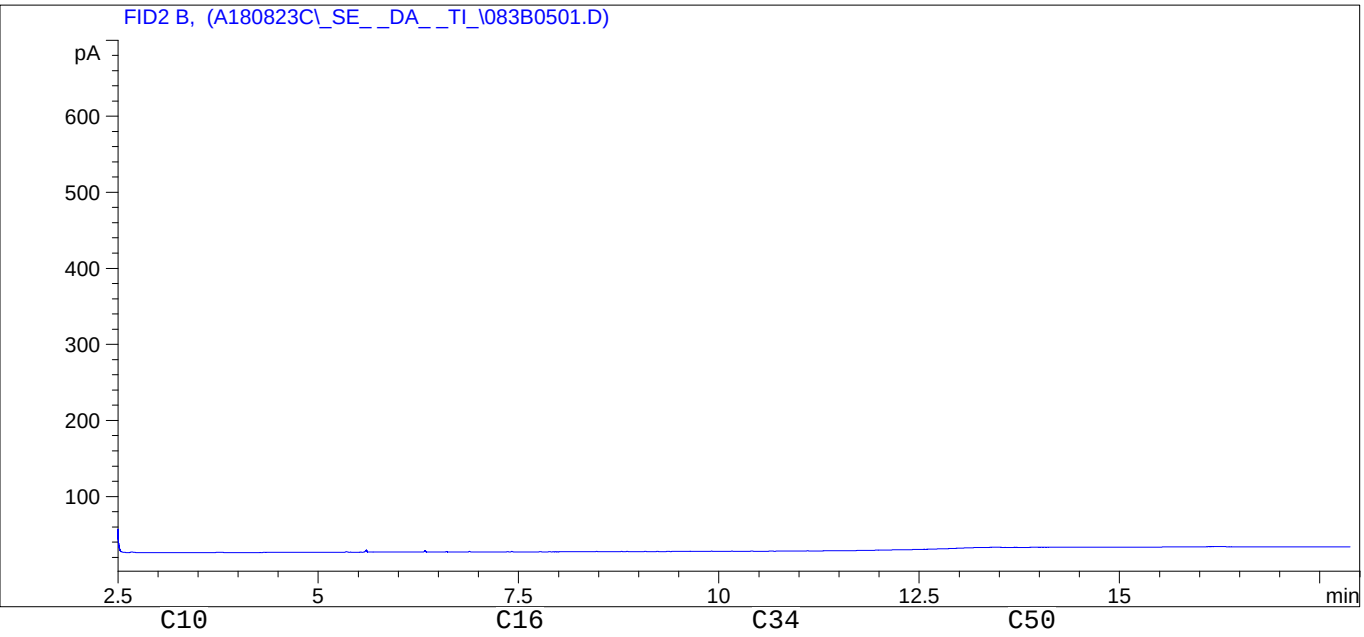
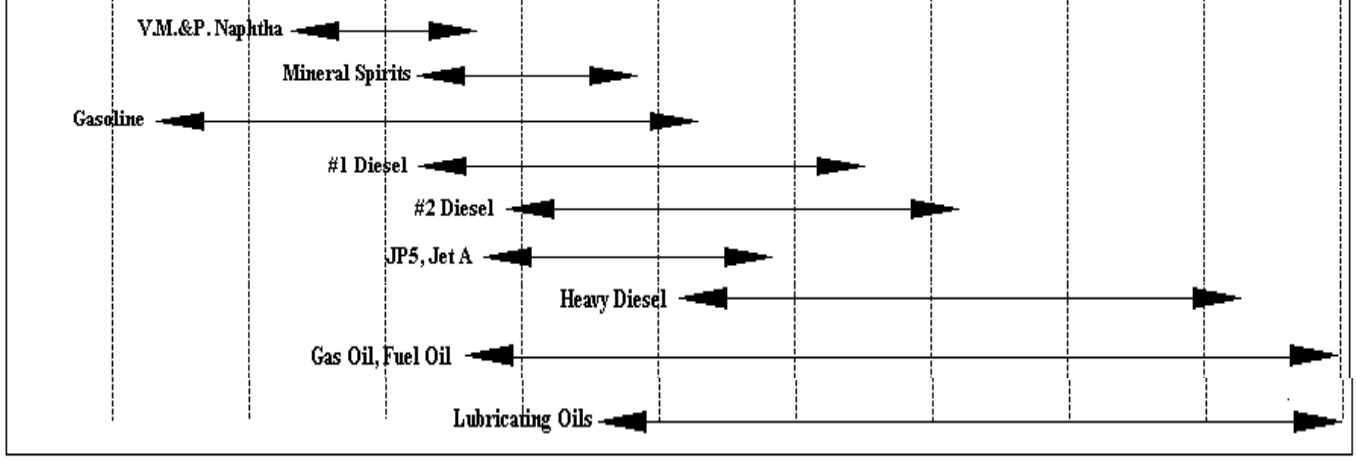
Client ID: EV_OCGW_WG_2018-08_NP

Sample ID: L2150459-4 rerun
Injection Date: 8/25/2018
Injection Time: 3:59:46 PM
Instrument ID: HP9
Operator:



Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Summed Peaks Report

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Final Summed Peaks Report

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L2150459

Teck

COC ID: 20180820 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Elkview Operations			Lab Name	ALS Calgary			Report Format / Distribution	Excel	PDF	EDD
Job Description	Q3 Ground Water Sampling			Lab Contact	Lyudmyla Shvets			Email 1: Bryan.Ogden@teck.com	X	X	X
Project Manager	Cameron Griffin			Email	Lyundyla.Shvets@alsglobal.com			Email 2: teckcoal@equisonline.com			X
Email	Cameron.Griffin@Teck.com			Address	2559 29 St NE.			Email 3: James.Boldt@teck.com	X	X	X
Address	RR#1 HWY#3							Email 4: Cameron.Griffin@teck.com	X	X	X
								Email 5: Teck.Lab.Results@sharepoint.teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO # 538780			
Postal Code	V1C 4C3	Country	Canada	Postal Code	T1Y 7B5	Country	Canada				
Phone Number	1-250-865-5289			Phone Number	1 403 291 9897						

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTERED	PRESERVED	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorus	TKN/TOC (APHA 4500-N/ORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	Total Nitrogen for BC (NO2 and NO3)	EPH (C10-C32)	T-Metals	D-Mercury
										No	No	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes
												Nitric	Sulphuric	Sulphuric	Sulphuric		HCl		Sodium Bisulphate	Nitric	HCl
EV_MC5gw_WG_2018-08_NP	EV_MC5gw	WG	N	8/20/2018	12:55	G	7			1		1		1	1		1	1	2		
EV_MC6gw_WG_2018-08_NP	EV_MC6gw	WG	N	8/20/2018	13:00	G	7			1		1		1	1		1	1	2		
EV_MC7gw_WG_2018-08_NP	EV_MC7gw	WG	N	8/20/2018	13:05	G	6			1					1	1		1	2	1	
EV_OCgw_WG_2018-08_NP	EV_OCgw	WG	N	8/20/2018	12:50	G	7			1		1		1	1		1	1	2		
EV_MCgwS_WG_2018-08_NP	EV_MCgwS	WG	N	8/20/2018	9:00	G	5			1		1		1	1		1	1			
EV_MCgwD_WG_2018-08_NP	EV_MCgwD	WG	N	8/20/2018	10:50	G	5			1		1		1	1		1	1			
EV_GCgw_WG_2018-08_NP	EV_GCgw	WG	N	8/20/2018	14:35	G	5			1		1		1	1			1			1
EV_OCgw_WG_2018-08_FB-HG	EV_OCgw	WG	N	8/20/2018	12:50	G	1										1				
EV_MCgwS_WG_2018-08_FB-HG	EV_MCgwS	WG	N	8/20/2018	9:00	G	1										1				
EV_MCgwD_WG_2018-08_FB-HG	EV_MCgwD	WG	N	8/20/2018	10:50	G	1										1				
						Total	45														

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Dissolved Ultra-trace Mercury samples are filtered and preserved Please Send Metals Bottles to Burnaby for Analysis	Bryan Ogden	August 20, 2018		8/21/18

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Bryan Ogden	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	August 20, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

L2150459-COFC

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 07-SEP-18
Report Date: 20-SEP-18 19:02 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2160357

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180906GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2160357-1	L2160357-2			
	Description	WG	WG			
	Sampled Date	06-SEP-18	06-SEP-18			
	Sampled Time	10:55	09:40			
	Client ID	EV_BALGW_WG_2018-09_NP	EV_LSGW_WG_2018-09_NP			
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0			
	Conductivity (@ 25C) (uS/cm)	730	954			
	Hardness (as CaCO3) (mg/L)	342	619			
	pH (pH)	8.21	8.34			
	ORP (mV)	284	401			
	Total Suspended Solids (mg/L)	1.0	8.6			
	Total Dissolved Solids (mg/L)	417 DLHC	586 DLHC			
	Turbidity (NTU)	1.62	44.1			
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	5.1	<1.0			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	328	465			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	9.8			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	328	474			
	Ammonia as N (mg/L)	0.0690	0.217			
	Bromide (Br) (mg/L)	<0.050	<0.25 DLHC			
	Chloride (Cl) (mg/L)	1.60	9.2 DLHC			
	Fluoride (F) (mg/L)	0.236	0.33			
	Ion Balance (%)	97.4	117			
	Nitrate (as N) (mg/L)	0.0281	<0.025 DLHC			
	Nitrite (as N) (mg/L)	<0.0010	<0.0050 DLHC			
	Total Kjeldahl Nitrogen (mg/L)	0.161	0.214			
	Total Nitrogen (mg/L)	0.189	0.214			
	Orthophosphate-Dissolved (as P) (mg/L)	0.0018	0.0010			
	Phosphorus (P)-Total Dissolved (mg/L)	0.0035	0.0361			
	Phosphorus (P)-Total (mg/L)	0.0131	0.0387			
	Sulfate (SO4) (mg/L)	86.6	70.0 DLHC			
	Anion Sum (meq/L)	8.41	11.2			
	Cation Sum (meq/L)	8.20	13.1			
	Cation - Anion Balance (%)	-1.3	7.7			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.11	2.73			
	Total Organic Carbon (mg/L)	1.09	2.65			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00027	0.00263			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2160357-1	L2160357-2			
	Description	WG	WG			
	Sampled Date	06-SEP-18	06-SEP-18			
	Sampled Time	10:55	09:40			
	Client ID	EV_BALGW_WG_2018-09_NP	EV_LSGW_WG_2018-09_NP			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Barium (Ba)-Dissolved (mg/L)	0.0356	0.268			
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	0.159	0.056			
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050			
	Calcium (Ca)-Dissolved (mg/L)	90.1	116			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Dissolved (ug/L)	<0.10	1.31			
	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Dissolved (mg/L)	0.135	3.43			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	0.107	0.0620			
	Magnesium (Mg)-Dissolved (mg/L)	28.4	80.1			
	Manganese (Mn)-Dissolved (mg/L)	0.0417	1.22			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000717	0.00290			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00461			
	Potassium (K)-Dissolved (mg/L)	2.47	4.57			
	Selenium (Se)-Dissolved (ug/L)	0.491	0.073			
	Silicon (Si)-Dissolved (mg/L)	4.54	5.11			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	29.8	8.56			
	Strontium (Sr)-Dissolved (mg/L)	2.17	0.503			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000046			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.000172	0.00153			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	0.0061	0.0020			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2160357-1, -2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2160357-1, -2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2160357-1, -2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Reference Information

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-CL Water Phosphorus (P)-Total Dissolved APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions)

Reference Information

should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180906GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2160357 Report Date: 20-SEP-18

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4217454								
WG2878312-5 LCS								
Acidity (as CaCO3)			105.1		%		85-115	16-SEP-18
WG2878312-4 MB								
Acidity (as CaCO3)			2.0		mg/L		2	16-SEP-18
ALK-MAN-CL	**Water**							
Batch R4212507								
WG2873165-14 LCS								
Alkalinity, Total (as CaCO3)			100.9		%		85-115	10-SEP-18
WG2873165-17 LCS								
Alkalinity, Total (as CaCO3)			106.2		%		85-115	10-SEP-18
WG2873165-13 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	10-SEP-18
WG2873165-16 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	10-SEP-18
BE-D-L-CCMS-VA	**Water**							
Batch R4213033								
WG2873011-2 LCS								
Beryllium (Be)-Dissolved			94.4		%		80-120	11-SEP-18
WG2873011-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	11-SEP-18
BR-L-IC-N-CL	**Water**							
Batch R4205545								
WG2871428-10 LCS								
Bromide (Br)			98.5		%		85-115	07-SEP-18
WG2871428-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	07-SEP-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4217068								
WG2877838-6 LCS								
Dissolved Organic Carbon			97.2		%		80-120	15-SEP-18
WG2877838-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	15-SEP-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4217068								
WG2877838-6 LCS								
Total Organic Carbon			100.6		%		80-120	15-SEP-18
WG2877838-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4217068								
WG2877838-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	15-SEP-18
CL-IC-N-CL	**Water**							
Batch R4205545								
WG2871428-10 LCS								
Chloride (Cl)			101.0		%		90-110	07-SEP-18
WG2871428-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	07-SEP-18
COLOUR-TRUE-CL	**Water**							
Batch R4205759								
WG2871652-3 DUP		**L2160357-1**						
Colour, True		<5.0	<5.0	RPD-NA	CU	N/A	20	09-SEP-18
WG2871652-2 LCS								
Colour, True			101.3		%		85-115	09-SEP-18
WG2871652-1 MB								
Colour, True			<5.0		CU		5	09-SEP-18
EC-L-PCT-CL	**Water**							
Batch R4212507								
WG2873165-14 LCS								
Conductivity (@ 25C)			103.5		%		90-110	10-SEP-18
WG2873165-17 LCS								
Conductivity (@ 25C)			102.9		%		90-110	10-SEP-18
WG2873165-13 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	10-SEP-18
WG2873165-16 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	10-SEP-18
F-IC-N-CL	**Water**							
Batch R4205545								
WG2871428-10 LCS								
Fluoride (F)			104.0		%		90-110	07-SEP-18
WG2871428-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	07-SEP-18
HG-D-CVAA-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R4213528								
WG2872834-2 LCS								
Mercury (Hg)-Dissolved			103.6		%		80-120	12-SEP-18
WG2872834-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	12-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4213033								
WG2873011-2 LCS								
Aluminum (Al)-Dissolved			98.9		%		80-120	11-SEP-18
Antimony (Sb)-Dissolved			94.6		%		80-120	11-SEP-18
Arsenic (As)-Dissolved			96.5		%		80-120	11-SEP-18
Barium (Ba)-Dissolved			97.2		%		80-120	11-SEP-18
Bismuth (Bi)-Dissolved			99.8		%		80-120	11-SEP-18
Boron (B)-Dissolved			95.2		%		80-120	11-SEP-18
Cadmium (Cd)-Dissolved			96.1		%		80-120	11-SEP-18
Calcium (Ca)-Dissolved			96.4		%		80-120	11-SEP-18
Chromium (Cr)-Dissolved			95.7		%		80-120	11-SEP-18
Cobalt (Co)-Dissolved			96.8		%		80-120	11-SEP-18
Copper (Cu)-Dissolved			93.4		%		80-120	11-SEP-18
Iron (Fe)-Dissolved			101.5		%		80-120	11-SEP-18
Lead (Pb)-Dissolved			96.1		%		80-120	11-SEP-18
Lithium (Li)-Dissolved			94.7		%		80-120	11-SEP-18
Magnesium (Mg)-Dissolved			100.2		%		80-120	11-SEP-18
Manganese (Mn)-Dissolved			98.4		%		80-120	11-SEP-18
Molybdenum (Mo)-Dissolved			91.2		%		80-120	11-SEP-18
Nickel (Ni)-Dissolved			94.7		%		80-120	11-SEP-18
Potassium (K)-Dissolved			93.8		%		80-120	11-SEP-18
Selenium (Se)-Dissolved			92.1		%		80-120	11-SEP-18
Silicon (Si)-Dissolved			98.5		%		60-140	11-SEP-18
Silver (Ag)-Dissolved			90.1		%		80-120	11-SEP-18
Sodium (Na)-Dissolved			99.0		%		80-120	11-SEP-18
Strontium (Sr)-Dissolved			91.4		%		80-120	11-SEP-18
Thallium (Tl)-Dissolved			103.6		%		80-120	11-SEP-18
Tin (Sn)-Dissolved			92.8		%		80-120	11-SEP-18
Titanium (Ti)-Dissolved			93.6		%		80-120	11-SEP-18
Uranium (U)-Dissolved			92.9		%		80-120	11-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4213033								
WG2873011-2 LCS								
Vanadium (V)-Dissolved			97.2		%		80-120	11-SEP-18
Zinc (Zn)-Dissolved			90.4		%		80-120	11-SEP-18
WG2873011-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	11-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	11-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	11-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	11-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	11-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	11-SEP-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	11-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	11-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	11-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	11-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	11-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	11-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	11-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	11-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	11-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	11-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	11-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	11-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	11-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	11-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	11-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	11-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	11-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	11-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	11-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	11-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	11-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	11-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	11-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	11-SEP-18
NH3-L-F-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-L-F-CL	**Water**							
Batch R4219191								
WG2879633-6 LCS								
Ammonia as N			106.3		%		85-115	18-SEP-18
WG2879633-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	18-SEP-18
NO2-L-IC-N-CL	**Water**							
Batch R4205545								
WG2871428-10 LCS								
Nitrite (as N)			104.2		%		90-110	07-SEP-18
WG2871428-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	07-SEP-18
NO3-L-IC-N-CL	**Water**							
Batch R4205545								
WG2871428-10 LCS								
Nitrate (as N)			101.4		%		90-110	07-SEP-18
WG2871428-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	07-SEP-18
ORP-CL	**Water**							
Batch R4214475								
WG2873749-5 CRM		**CL-ORP**						
ORP			225		mV		210-230	11-SEP-18
P-T-L-COL-CL	**Water**							
Batch R4228308								
WG2881771-74 LCS								
Phosphorus (P)-Total			102.5		%		80-120	20-SEP-18
WG2881771-73 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	20-SEP-18
P-TD-L-COL-CL	**Water**							
Batch R4228308								
WG2881771-74 LCS								
Phosphorus (P)-Total	Dissolved		102.5		%		80-120	20-SEP-18
WG2881771-73 MB								
Phosphorus (P)-Total	Dissolved		<0.0020		mg/L		0.002	20-SEP-18
PH-CL	**Water**							

Quality Control Report

Workorder: L2160357 Report Date: 20-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-CL	**Water**							
Batch R4212507								
WG2873165-14 LCS								
pH			7.01		pH		6.9-7.1	10-SEP-18
WG2873165-17 LCS								
pH			6.96		pH		6.9-7.1	10-SEP-18
PO4-DO-L-COL-CL	**Water**							
Batch R4207327								
WG2871821-7 DUP		**L2160357-1**						
Orthophosphate-Dissolved (as P)		0.0018	0.0015		mg/L	16	20	08-SEP-18
WG2871821-6 LCS								
Orthophosphate-Dissolved (as P)			98.6		%		80-120	09-SEP-18
WG2871821-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	09-SEP-18
WG2871821-8 MS		**L2160357-1**						
Orthophosphate-Dissolved (as P)			106.0		%		70-130	08-SEP-18
SO4-IC-N-CL	**Water**							
Batch R4205545								
WG2871428-10 LCS								
Sulfate (SO4)			101.8		%		90-110	07-SEP-18
WG2871428-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	07-SEP-18
SOLIDS-TDS-CL	**Water**							
Batch R4215421								
WG2874239-6 DUP		**L2160357-2**						
Total Dissolved Solids		586	586		mg/L	0.0	20	12-SEP-18
WG2874239-5 LCS								
Total Dissolved Solids			105.4		%		85-115	12-SEP-18
WG2874239-4 MB								
Total Dissolved Solids			<10		mg/L		10	12-SEP-18
TKN-L-F-CL	**Water**							
Batch R4215449								
WG2875856-14 LCS								
Total Kjeldahl Nitrogen			103.4		%		75-125	13-SEP-18
WG2875856-13 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	13-SEP-18
TSS-L-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-L-CL	**Water**							
Batch R4215655								
WG2874898-8 LCS								
Total Suspended Solids			92.0		%		85-115	12-SEP-18
WG2874898-7 MB								
Total Suspended Solids			<1.0		mg/L		1	12-SEP-18
TURBIDITY-CL	**Water**							
Batch R4205681								
WG2871530-9 DUP		**L2160357-2**						
Turbidity		44.1	43.7		NTU	0.9	15	08-SEP-18
WG2871530-8 LCS								
Turbidity			97.5		%		85-115	08-SEP-18
WG2871530-7 MB								
Turbidity			<0.10		NTU		0.1	08-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	06-SEP-18 10:55	11-SEP-18 10:50	0.25	120	hours	EHTR-FM
	2	06-SEP-18 09:40	11-SEP-18 10:50	0.25	121	hours	EHTR-FM
pH							
	1	06-SEP-18 10:55	10-SEP-18 14:00	0.25	99	hours	EHTR-FM
	2	06-SEP-18 09:40	10-SEP-18 14:00	0.25	100	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2160357 were received on 07-SEP-18 09:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 20180906GW

TURNAROUND TIME

L2160357-COFC

	Excel	PDF	EDD
	X	X	X
			X
	X	X	X
	X	X	X
	X	X	X

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations			Lab Name	ALS Calgn		
Job Description	Q3 Ground Water Sampling			Lab Contact	Lyudmyla		
Project Manager	Cameron Griffin			Email	Lyundyla.S		
Email	Cameron.Griffin@Teck.com			Address	2559 29 St		
Address	RR#1 HWY# 3					Email 5	Teck.Lab.Results@sharepoint.teck.com
City	Sparwood	Province	BC	City	Calgary	Province	AB
Postal Code	V1C 4C3	Country	Canada	Postal Code	T1Y 7B5	Country	Canada
Phone Number	1-250-865-5289			Phone Number	1 403 291 9897	PO #	5387000

SAMPLE DETAILS — **ANALYSES REQUESTED**

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont	FILTERED	PRESERVED	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorus	D-ULTRA MERCURY (SW6020)	T-ULTRA MERCURY (SW6020)	TKN/TOC (APHA 4500-NORG)	Total Nitrogen for BC (NO2 and NO3)	EPH (C10-C32)	T-Mercury	D-Mercury
										No	No	Yes	Yes		No	No	No	No	No	No	Yes
												Nitric	Sulphuric		Sulphuric				Sodium Bisulphate	Nitric	HCl
EV_BALgw_WG_2018-09_NP	EV_BALgw	WG	N	9/6/2018	10:55	G	5			1		1	1				1				1
EV_LSgw_WG_2018-09_NP	EV_LSgw	WG	N	9/6/2018	9:40	G	5			1		1	1				1				1
						Total	10														

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Bryan Ogden	September 6, 2018		9/7 930

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Bryan Ogden	Mobile #	
Sampler's Signature		Date/Time	September 6, 2018

7D

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 19-SEP-18
Report Date: 23-SEP-18 17:49 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2166734

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180918
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2166734-1	L2166734-2	L2166734-3		
	Description	WG	WG	WG		
	Sampled Date	18-SEP-18	18-SEP-18	18-SEP-18		
	Sampled Time	14:15	14:00	10:40		
	Client ID	EV_ER1GWS_WG_2018-09_NP	EV_ER1GWD_WG_2018-09_NP	EV_WF_SW_WG_2018-09_NP		
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0		
	Conductivity (@ 25C) (uS/cm)	459	449	455		
	Hardness (as CaCO3) (mg/L)	244	233	203		
	pH (pH)	8.07	8.20	7.96		
	ORP (mV)	458	347	350		
	Total Suspended Solids (mg/L)	<1.0	8.2	23.4		
	Total Dissolved Solids (mg/L)	308 DLHC	279 DLHC	293 DLHC		
	Turbidity (NTU)	0.21	7.43	16.4		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	3.6	1.7	1.9		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	167	214	61.9		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	167	214	61.9		
	Ammonia as N (mg/L)	<0.0050	0.0098	0.185		
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050		
	Chloride (Cl) (mg/L)	2.84	5.73	3.11		
	Fluoride (F) (mg/L)	0.221	0.261	0.093		
	Ion Balance (%)	98.2	92.0	90.5		
	Nitrate (as N) (mg/L)	1.97	0.704	0.0144		
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	0.0013		
	Total Kjeldahl Nitrogen (mg/L)	0.389	0.352	0.513		
	Total Nitrogen (mg/L)	2.36	1.06	0.529		
	Orthophosphate-Dissolved (as P) (mg/L)	0.0018	<0.0010	<0.0010		
	Phosphorus (P)-Total Dissolved (mg/L)	0.0020	<0.0020	0.0034		
	Phosphorus (P)-Total (mg/L)	<0.0020	0.0088	0.0100		
	Sulfate (SO4) (mg/L)	74.5	34.8	166		
	Anion Sum (meq/L)	5.12	5.23	4.80		
	Cation Sum (meq/L)	5.03	4.82	4.34		
	Cation - Anion Balance (%)	-0.9	-4.2	-5.0		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.77	1.75	2.28		
	Total Organic Carbon (mg/L)	0.72	1.82	3.91		
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	0.0075	<0.0030		
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Arsenic (As)-Dissolved (mg/L)	0.00015	0.00019	<0.00010		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2166734-1	L2166734-2	L2166734-3		
	Description	WG	WG	WG		
	Sampled Date	18-SEP-18	18-SEP-18	18-SEP-18		
	Sampled Time	14:15	14:00	10:40		
	Client ID	EV_ER1GWS_WG_2018-09_NP	EV_ER1GWD_WG_2018-09_NP	EV_WF_SW_WG_2018-09_NP		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Barium (Ba)-Dissolved (mg/L)	0.108	0.0995	0.00747		
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Cadmium (Cd)-Dissolved (ug/L)	0.0132	<0.0050	<0.0050		
	Calcium (Ca)-Dissolved (mg/L)	65.8	59.8	17.6		
	Chromium (Cr)-Dissolved (mg/L)	0.00024	0.00034	<0.00010		
	Cobalt (Co)-Dissolved (ug/L)	<0.10	0.29	<0.10		
	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00060 DLB	<0.00050		
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
	Lithium (Li)-Dissolved (mg/L)	0.0078	0.0073	0.0098		
	Magnesium (Mg)-Dissolved (mg/L)	19.4	20.4	38.6		
	Manganese (Mn)-Dissolved (mg/L)	0.00026	0.0771	0.230		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	0.0000067		
	Molybdenum (Mo)-Dissolved (mg/L)	0.00133	0.00161	0.000471		
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00161	<0.00050		
	Potassium (K)-Dissolved (mg/L)	0.848	0.803	2.76		
	Selenium (Se)-Dissolved (ug/L)	11.8	4.56	0.062		
	Silicon (Si)-Dissolved (mg/L)	2.24	3.23	<0.050		
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	3.07	2.95	4.53		
	Strontium (Sr)-Dissolved (mg/L)	0.195	0.193	0.0145		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	0.00011		
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	0.00116	0.00145	0.000020		
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	<0.0020 DLB	<0.0030 DLB	<0.0010		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Copper (Cu)-Dissolved	MB-LOR	L2166734-1, -2, -3
Method Blank	Zinc (Zn)-Dissolved	MB-LOR	L2166734-1, -2, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2166734-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2166734-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2166734-1, -2, -3
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2166734-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2166734-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2166734-1, -2, -3
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2166734-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

Reference Information

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-CL Water Phosphorus (P)-Total Dissolved APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180918

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4234648								
WG2884485-9 DUP		**L2166734-2**						
Acidity (as CaCO3)		1.7	<1.0	RPD-NA	mg/L	N/A	20	23-SEP-18
WG2884485-8 LCS								
Acidity (as CaCO3)			114.9		%		85-115	23-SEP-18
WG2884485-7 MB								
Acidity (as CaCO3)			2.0		mg/L		2	23-SEP-18
ALK-MAN-CL	**Water**							
Batch R4231667								
WG2882279-20 LCS								
Alkalinity, Total (as CaCO3)			104.2		%		85-115	20-SEP-18
WG2882279-19 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	20-SEP-18
BE-D-L-CCMS-VA	**Water**							
Batch R4229373								
WG2882428-2 LCS								
Beryllium (Be)-Dissolved			101.2		%		80-120	20-SEP-18
WG2882428-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	20-SEP-18
BR-L-IC-N-CL	**Water**							
Batch R4227968								
WG2882213-6 LCS								
Bromide (Br)			101.8		%		85-115	19-SEP-18
WG2882213-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	19-SEP-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4232087								
WG2883529-2 LCS								
Dissolved Organic Carbon			112.9		%		80-120	21-SEP-18
WG2883529-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	21-SEP-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4232087								
WG2883529-2 LCS								
Total Organic Carbon			110.0		%		80-120	21-SEP-18
WG2883529-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	21-SEP-18
CL-IC-N-CL	**Water**							

Quality Control Report

Workorder: L2166734 Report Date: 23-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-CL	**Water**							
Batch R4227968								
WG2882213-6 LCS								
Chloride (Cl)			100.2		%		90-110	19-SEP-18
WG2882213-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-SEP-18
COLOUR-TRUE-CL	**Water**							
Batch R4231367								
WG2883349-2 LCS								
Colour, True			100.1		%		85-115	21-SEP-18
WG2883349-1 MB								
Colour, True			<5.0		CU		5	21-SEP-18
EC-L-PCT-CL	**Water**							
Batch R4231667								
WG2882279-20 LCS								
Conductivity (@ 25C)			101.8		%		90-110	20-SEP-18
WG2882279-19 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	20-SEP-18
F-IC-N-CL	**Water**							
Batch R4227968								
WG2882213-6 LCS								
Fluoride (F)			103.8		%		90-110	19-SEP-18
WG2882213-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4233249								
WG2882639-66 LCS								
Mercury (Hg)-Dissolved			100.7		%		80-120	22-SEP-18
WG2882639-65 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	22-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4229373								
WG2882428-2 LCS								
Aluminum (Al)-Dissolved			98.6		%		80-120	20-SEP-18
Antimony (Sb)-Dissolved			99.9		%		80-120	20-SEP-18
Arsenic (As)-Dissolved			98.6		%		80-120	20-SEP-18
Barium (Ba)-Dissolved			100.0		%		80-120	20-SEP-18
Bismuth (Bi)-Dissolved			103.1		%		80-120	20-SEP-18
Boron (B)-Dissolved			89.4		%		80-120	20-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4229373								
WG2882428-2 LCS								
Cadmium (Cd)-Dissolved			99.7		%		80-120	20-SEP-18
Calcium (Ca)-Dissolved			97.5		%		80-120	20-SEP-18
Chromium (Cr)-Dissolved			99.9		%		80-120	20-SEP-18
Cobalt (Co)-Dissolved			97.6		%		80-120	20-SEP-18
Copper (Cu)-Dissolved			95.6		%		80-120	20-SEP-18
Iron (Fe)-Dissolved			96.3		%		80-120	20-SEP-18
Lead (Pb)-Dissolved			101.2		%		80-120	20-SEP-18
Lithium (Li)-Dissolved			98.6		%		80-120	20-SEP-18
Magnesium (Mg)-Dissolved			98.8		%		80-120	20-SEP-18
Manganese (Mn)-Dissolved			97.6		%		80-120	20-SEP-18
Molybdenum (Mo)-Dissolved			97.2		%		80-120	20-SEP-18
Nickel (Ni)-Dissolved			95.1		%		80-120	20-SEP-18
Potassium (K)-Dissolved			102.3		%		80-120	20-SEP-18
Selenium (Se)-Dissolved			99.5		%		80-120	20-SEP-18
Silicon (Si)-Dissolved			94.1		%		60-140	20-SEP-18
Silver (Ag)-Dissolved			98.0		%		80-120	20-SEP-18
Sodium (Na)-Dissolved			98.9		%		80-120	20-SEP-18
Strontium (Sr)-Dissolved			99.6		%		80-120	20-SEP-18
Thallium (Tl)-Dissolved			105.3		%		80-120	20-SEP-18
Tin (Sn)-Dissolved			97.1		%		80-120	20-SEP-18
Titanium (Ti)-Dissolved			97.0		%		80-120	20-SEP-18
Uranium (U)-Dissolved			99.4		%		80-120	20-SEP-18
Vanadium (V)-Dissolved			99.5		%		80-120	20-SEP-18
Zinc (Zn)-Dissolved			100.1		%		80-120	20-SEP-18
WG2882428-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	20-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	20-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	20-SEP-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	20-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	20-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4229373								
WG2882428-1 MB		**NP**						
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Copper (Cu)-Dissolved			<0.0030	MB-LOR	mg/L		0.003	20-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	20-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	20-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	20-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	20-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	20-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	20-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	20-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	20-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	20-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	20-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	20-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	20-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	20-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	20-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	20-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	20-SEP-18
Zinc (Zn)-Dissolved			<0.0020	MB-LOR	mg/L		0.002	20-SEP-18
NH3-L-F-CL	**Water**							
Batch R4228353								
WG2882292-14 LCS								
Ammonia as N			112.4		%		85-115	20-SEP-18
WG2882292-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	20-SEP-18
NO2-L-IC-N-CL	**Water**							
Batch R4227968								
WG2882213-6 LCS								
Nitrite (as N)			104.6		%		90-110	19-SEP-18
WG2882213-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	19-SEP-18
NO3-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4227968								
WG2882213-6 LCS								
Nitrate (as N)			100.7		%		90-110	19-SEP-18
WG2882213-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	19-SEP-18
ORP-CL	**Water**							
Batch R4229814								
WG2881756-3 CRM		**CL-ORP**						
ORP			218		mV		210-230	20-SEP-18
P-T-L-COL-CL	**Water**							
Batch R4233894								
WG2884245-2 LCS								
Phosphorus (P)-Total			105.8		%		80-120	22-SEP-18
WG2884245-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	22-SEP-18
P-TD-L-COL-CL	**Water**							
Batch R4233894								
WG2884245-2 LCS								
Phosphorus (P)-Total Dissolved			105.8		%		80-120	22-SEP-18
WG2884245-1 MB								
Phosphorus (P)-Total Dissolved			<0.0020		mg/L		0.002	22-SEP-18
PH-CL	**Water**							
Batch R4231667								
WG2882279-20 LCS								
pH			7.03		pH		6.9-7.1	20-SEP-18
PO4-DO-L-COL-CL	**Water**							
Batch R4230697								
WG2881208-11 LCS								
Orthophosphate-Dissolved (as P)			102.0		%		80-120	19-SEP-18
WG2881208-10 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	19-SEP-18
SO4-IC-N-CL	**Water**							
Batch R4227968								
WG2882213-6 LCS								
Sulfate (SO4)			100.5		%		90-110	19-SEP-18
WG2882213-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-CL	**Water**							
Batch R4227968								
WG2882213-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-SEP-18
SOLIDS-TDS-CL	**Water**							
Batch R4231308								
WG2881628-11 LCS								
Total Dissolved Solids			98.9		%		85-115	20-SEP-18
WG2881628-10 MB								
Total Dissolved Solids			<10		mg/L		10	20-SEP-18
TKN-L-F-CL	**Water**							
Batch R4231108								
WG2883140-10 LCS								
Total Kjeldahl Nitrogen			101.3		%		75-125	21-SEP-18
WG2883140-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	21-SEP-18
TSS-L-CL	**Water**							
Batch R4231310								
WG2881745-11 LCS								
Total Suspended Solids			95.1		%		85-115	20-SEP-18
WG2881745-10 MB								
Total Suspended Solids			<1.0		mg/L		1	20-SEP-18
TURBIDITY-CL	**Water**							
Batch R4227349								
WG2880658-5 LCS								
Turbidity			96.5		%		85-115	19-SEP-18
WG2880658-4 MB								
Turbidity			<0.10		NTU		0.1	19-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	18-SEP-18 14:15	20-SEP-18 09:24	0.25	43	hours	EHTR-FM
	2	18-SEP-18 14:00	20-SEP-18 09:24	0.25	43	hours	EHTR-FM
	3	18-SEP-18 10:40	20-SEP-18 09:24	0.25	47	hours	EHTR-FM
pH							
	1	18-SEP-18 14:15	21-SEP-18 13:00	0.25	71	hours	EHTR-FM
	2	18-SEP-18 14:00	20-SEP-18 10:00	0.25	44	hours	EHTR-FM
	3	18-SEP-18 10:40	20-SEP-18 10:00	0.25	47	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2166734 were received on 19-SEP-18 08:45.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2166734-COFC

COC ID: 20180918 | TURN | RUSH:

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations	Lab N					
Job Description	Q3 Ground Water Sampling	Lab Cor					
Project Manager	Cameron Griffin	Ema...					
Email	Cameron.Griffin@Teck.com	Address	2559 29 St NE.				
Address	RR#1 HWY# 3						
City	Sparwood	Province	BC	City	Calgary	Province	AB
Postal Code	V1C 4C3	Country	Canada	Postal Code	T1Y 7B5	Country	Canada
Phone Number	1-250-865-5289			Phone Number	1 403 291 9897		

bution	Excel	PDF	EDD
n@teck.com	X	X	X
equisonline.com			X
James.Boldt@teck.com	X	X	X
Cameron.Griffin@teck.com	X	X	X
Teck.Lab.Results@sharepoint.teck.com	X	X	X

Email 3: James.Boldt@teck.com
Email 4: Cameron.Griffin@teck.com
Email 5: Teck.Lab.Results@sharepoint.teck.com
PO # 538700

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTERED	PRESERVED	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorus	TKN/TOC (APHA 4500-NORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	Total Nitrogen for BC (NO2 and NO3)	EPH (C10-C32)	T-Metals	D-Mercury
								(Y/N)	(Y/N)	No	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes
												Nitric	Sulphuric	Sulphuric	Sulphuric				Sodium Bisulphate	Nitric	HCl
EV_ER1gwS_WG_2018-09_NP	EV_ER1gwS	WG	N	9/18/2018	14:15	G	5			1		1	1		1			1			1
EV_ER1gwD_WG_2018-09_NP	EV_ER1gwD	WG	N	9/18/2018	14:00	G	5			1		1	1		1			1			1
EV_WF_SW_WG_2018-09_NP	EV_WF_SW	WG	N	9/18/2018	10:40	G	5			1		1	1		1			1			1
					Total		15														

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Ultra-trace Mercury samples are unfiltered and unpreserved
Total Methyl Mercury samples are preserved but unfiltered
Total Selenium samples are preserved but unfiltered
Dissolved Selenium samples are preserved and filtered

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Kimberley Hackett	September 18, 2018		9/19 8:45

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Kimberley Hackett	Mobile #	
Sampler's Signature		Date/Time	September 18, 2018

2°

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 20-SEP-18
Report Date: 24-SEP-18 15:18 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2167626

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20180919GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2167626-1				
	Description	WG				
	Sampled Date	19-SEP-18				
	Sampled Time	14:45				
	Client ID	EV_ECGW_WG_2018-09_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0				
	Conductivity (@ 25C) (uS/cm)	418				
	Hardness (as CaCO3) (mg/L)	178				
	pH (pH)	8.06				
	ORP (mV)	332				
	Total Suspended Solids (mg/L)	20.3				
	Total Dissolved Solids (mg/L)	306 DLHC				
	Turbidity (NTU)	21.8				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	203				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	203				
	Ammonia as N (mg/L)	0.109				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	0.99				
	Fluoride (F) (mg/L)	0.850				
	Ion Balance (%)	101				
	Nitrate (as N) (mg/L)	0.131				
	Nitrite (as N) (mg/L)	0.0100				
	Total Kjeldahl Nitrogen (mg/L)	0.588				
	Total Nitrogen (mg/L)	0.729				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0076 HTD				
	Phosphorus (P)-Total Dissolved (mg/L)	0.0085				
	Phosphorus (P)-Total (mg/L)	0.0260				
	Sulfate (SO4) (mg/L)	26.7				
	Anion Sum (meq/L)	4.70				
	Cation Sum (meq/L)	4.76				
	Cation - Anion Balance (%)	0.6				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.63				
	Total Organic Carbon (mg/L)	2.29				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	0.00045				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2167626-1
	Description	WG
	Sampled Date	19-SEP-18
	Sampled Time	14:45
	Client ID	EV_ECGW_WG_2018-09_NP
Grouping	**Analyte**	
WATER		
Dissolved Metals	Barium (Ba)-Dissolved (mg/L)	0.0611
	Beryllium (Be)-Dissolved (ug/L)	<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050
	Boron (B)-Dissolved (mg/L)	0.117
	Cadmium (Cd)-Dissolved (ug/L)	0.0481
	Calcium (Ca)-Dissolved (mg/L)	38.6
	Chromium (Cr)-Dissolved (mg/L)	<0.00010
	Cobalt (Co)-Dissolved (ug/L)	0.32
	Copper (Cu)-Dissolved (mg/L)	0.00585
	Iron (Fe)-Dissolved (mg/L)	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0113
	Magnesium (Mg)-Dissolved (mg/L)	19.7
	Manganese (Mn)-Dissolved (mg/L)	0.178
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.0153
	Nickel (Ni)-Dissolved (mg/L)	0.00663
	Potassium (K)-Dissolved (mg/L)	3.74
	Selenium (Se)-Dissolved (ug/L)	0.206
	Silicon (Si)-Dissolved (mg/L)	4.93
	Silver (Ag)-Dissolved (mg/L)	<0.000010
	Sodium (Na)-Dissolved (mg/L)	25.4
	Strontium (Sr)-Dissolved (mg/L)	0.471
	Thallium (Tl)-Dissolved (mg/L)	0.000026
	Tin (Sn)-Dissolved (mg/L)	0.00031
	Titanium (Ti)-Dissolved (mg/L)	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00108
	Vanadium (V)-Dissolved (mg/L)	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0061

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Acidity (as CaCO3)	LCS-H	L2167626-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Reference Information

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-CL Water Phosphorus (P)-Total Dissolved APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions)

Reference Information

should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20180919GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4234648								
WG2884485-5 LCS								
Acidity (as CaCO3)			115.3	LCS-H	%		85-115	23-SEP-18
WG2884485-4 MB								
Acidity (as CaCO3)			1.3		mg/L		2	23-SEP-18
BE-D-L-CCMS-VA	**Water**							
Batch R4233007								
WG2883612-3 DUP		**L2167626-1**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	21-SEP-18
WG2883612-2 LCS								
Beryllium (Be)-Dissolved			98.4		%		80-120	21-SEP-18
WG2883612-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	21-SEP-18
BR-L-IC-N-CL	**Water**							
Batch R4230107								
WG2882967-7 DUP		**L2167626-1**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	20-SEP-18
WG2882967-6 LCS								
Bromide (Br)			96.7		%		85-115	20-SEP-18
WG2882967-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	20-SEP-18
WG2882967-8 MS		**L2167626-1**						
Bromide (Br)			82.3		%		75-125	21-SEP-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4233388								
WG2883965-2 LCS								
Dissolved Organic Carbon			103.0		%		80-120	21-SEP-18
WG2883965-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	21-SEP-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4233388								
WG2883965-2 LCS								
Total Organic Carbon			103.5		%		80-120	21-SEP-18
WG2883965-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	21-SEP-18
CL-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-CL	**Water**							
Batch R4230107								
WG2882967-7 DUP		**L2167626-1**						
Chloride (Cl)		0.99	0.98		mg/L	0.5	20	20-SEP-18
WG2882967-6 LCS								
Chloride (Cl)			100.7		%		90-110	20-SEP-18
WG2882967-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	20-SEP-18
WG2882967-8 MS		**L2167626-1**						
Chloride (Cl)			97.7		%		75-125	20-SEP-18
COLOUR-TRUE-CL	**Water**							
Batch R4234187								
WG2883742-2 LCS								
Colour, True			100.6		%		85-115	22-SEP-18
WG2883742-1 MB								
Colour, True			<5.0		CU		5	22-SEP-18
F-IC-N-CL	**Water**							
Batch R4230107								
WG2882967-7 DUP		**L2167626-1**						
Fluoride (F)		0.850	0.864		mg/L	1.6	20	20-SEP-18
WG2882967-6 LCS								
Fluoride (F)			102.9		%		90-110	20-SEP-18
WG2882967-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	20-SEP-18
WG2882967-8 MS		**L2167626-1**						
Fluoride (F)			101.5		%		75-125	20-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4233007								
WG2883612-3 DUP		**L2167626-1**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	21-SEP-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	21-SEP-18
Arsenic (As)-Dissolved		0.00045	0.00043		mg/L	4.6	20	21-SEP-18
Barium (Ba)-Dissolved		0.0611	0.0584		mg/L	4.5	20	21-SEP-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	21-SEP-18
Boron (B)-Dissolved		0.117	0.117		mg/L	0.1	20	21-SEP-18
Cadmium (Cd)-Dissolved		0.0000481	0.0000435		mg/L	10	20	21-SEP-18
Calcium (Ca)-Dissolved		38.6	38.5		mg/L	0.2	20	21-SEP-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	21-SEP-18
Cobalt (Co)-Dissolved		0.00032	0.00031		mg/L	2.9	20	21-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4233007								
WG2883612-3 DUP		**L2167626-1**						
Copper (Cu)-Dissolved		0.00585	0.00561		mg/L	4.3	20	21-SEP-18
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	21-SEP-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	21-SEP-18
Lithium (Li)-Dissolved		0.0113	0.0111		mg/L	1.2	20	21-SEP-18
Magnesium (Mg)-Dissolved		19.7	18.9		mg/L	4.4	20	21-SEP-18
Manganese (Mn)-Dissolved		0.178	0.172		mg/L	3.3	20	21-SEP-18
Molybdenum (Mo)-Dissolved		0.0153	0.0153		mg/L	0.1	20	21-SEP-18
Nickel (Ni)-Dissolved		0.00663	0.00652		mg/L	1.7	20	21-SEP-18
Potassium (K)-Dissolved		3.74	3.58		mg/L	4.2	20	21-SEP-18
Silicon (Si)-Dissolved		4.93	4.75		mg/L	3.7	20	21-SEP-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	21-SEP-18
Sodium (Na)-Dissolved		25.4	23.9		mg/L	5.9	20	21-SEP-18
Strontium (Sr)-Dissolved		0.471	0.453		mg/L	3.7	20	21-SEP-18
Thallium (Tl)-Dissolved		0.000026	0.000026		mg/L	0.0	20	21-SEP-18
Tin (Sn)-Dissolved		0.00031	0.00032		mg/L	2.6	20	21-SEP-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	21-SEP-18
Uranium (U)-Dissolved		0.00108	0.00108		mg/L	0.3	20	21-SEP-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	21-SEP-18
Zinc (Zn)-Dissolved		0.0061	0.0055		mg/L	12	20	21-SEP-18
WG2883612-2 LCS								
Aluminum (Al)-Dissolved			99.7		%		80-120	21-SEP-18
Antimony (Sb)-Dissolved			101.1		%		80-120	21-SEP-18
Arsenic (As)-Dissolved			98.1		%		80-120	21-SEP-18
Barium (Ba)-Dissolved			100.2		%		80-120	21-SEP-18
Bismuth (Bi)-Dissolved			94.6		%		80-120	21-SEP-18
Boron (B)-Dissolved			94.1		%		80-120	21-SEP-18
Cadmium (Cd)-Dissolved			99.0		%		80-120	21-SEP-18
Calcium (Ca)-Dissolved			96.9		%		80-120	21-SEP-18
Chromium (Cr)-Dissolved			95.5		%		80-120	21-SEP-18
Cobalt (Co)-Dissolved			96.4		%		80-120	21-SEP-18
Copper (Cu)-Dissolved			93.5		%		80-120	21-SEP-18
Iron (Fe)-Dissolved			92.2		%		80-120	21-SEP-18
Lead (Pb)-Dissolved			97.1		%		80-120	21-SEP-18
Lithium (Li)-Dissolved			97.9		%		80-120	21-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4233007								
WG2883612-2 LCS								
Magnesium (Mg)-Dissolved			96.3		%		80-120	21-SEP-18
Manganese (Mn)-Dissolved			96.8		%		80-120	21-SEP-18
Molybdenum (Mo)-Dissolved			103.9		%		80-120	21-SEP-18
Nickel (Ni)-Dissolved			95.8		%		80-120	21-SEP-18
Potassium (K)-Dissolved			97.3		%		80-120	21-SEP-18
Silicon (Si)-Dissolved			93.9		%		60-140	21-SEP-18
Silver (Ag)-Dissolved			98.4		%		80-120	21-SEP-18
Sodium (Na)-Dissolved			99.2		%		80-120	21-SEP-18
Strontium (Sr)-Dissolved			99.9		%		80-120	21-SEP-18
Thallium (Tl)-Dissolved			98.2		%		80-120	21-SEP-18
Tin (Sn)-Dissolved			100.1		%		80-120	21-SEP-18
Titanium (Ti)-Dissolved			96.2		%		80-120	21-SEP-18
Uranium (U)-Dissolved			90.7		%		80-120	21-SEP-18
Vanadium (V)-Dissolved			99.1		%		80-120	21-SEP-18
Zinc (Zn)-Dissolved			95.2		%		80-120	21-SEP-18
WG2883612-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	21-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	21-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	21-SEP-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	21-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	21-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	21-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	21-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	21-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	21-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	21-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	21-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	21-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4233007								
WG2883612-1 MB		**NP**						
Potassium (K)-Dissolved			<0.050		mg/L		0.05	21-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	21-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	21-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	21-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	21-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	21-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	21-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	21-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	21-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	21-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	21-SEP-18
Batch R4235372								
WG2883937-3 DUP		**L2167626-1**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	22-SEP-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	22-SEP-18
Arsenic (As)-Dissolved		0.00045	0.00040		mg/L	1.6	20	22-SEP-18
Barium (Ba)-Dissolved		0.0611	0.0566		mg/L	1.0	20	22-SEP-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	22-SEP-18
Boron (B)-Dissolved		0.117	0.114		mg/L	1.9	20	22-SEP-18
Cadmium (Cd)-Dissolved		0.0000481	0.0000452		mg/L	6.1	20	22-SEP-18
Calcium (Ca)-Dissolved		38.6	37.7		mg/L	0.1	20	22-SEP-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	22-SEP-18
Cobalt (Co)-Dissolved		0.00032	0.00031		mg/L	4.9	20	22-SEP-18
Copper (Cu)-Dissolved		0.00585	0.00544		mg/L	1.5	20	22-SEP-18
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	22-SEP-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	22-SEP-18
Lithium (Li)-Dissolved		0.0113	0.0110		mg/L	1.6	20	22-SEP-18
Magnesium (Mg)-Dissolved		19.7	18.0		mg/L	1.6	20	22-SEP-18
Manganese (Mn)-Dissolved		0.178	0.170		mg/L	2.6	20	22-SEP-18
Molybdenum (Mo)-Dissolved		0.0153	0.0142		mg/L	0.5	20	22-SEP-18
Nickel (Ni)-Dissolved		0.00663	0.00627		mg/L	2.4	20	22-SEP-18
Potassium (K)-Dissolved		3.74	3.45		mg/L	2.4	20	22-SEP-18
Selenium (Se)-Dissolved		0.000206	0.000186		mg/L	11	20	22-SEP-18
Silicon (Si)-Dissolved		4.93	4.57		mg/L	1.9	20	22-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4235372								
WG2883937-3 DUP		**L2167626-1**						
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	22-SEP-18
Sodium (Na)-Dissolved		25.4	23.1		mg/L	4.3	20	22-SEP-18
Strontium (Sr)-Dissolved		0.471	0.441		mg/L	0.1	20	22-SEP-18
Thallium (Tl)-Dissolved		0.000026	0.000028		mg/L	3.1	20	22-SEP-18
Tin (Sn)-Dissolved		0.00031	0.00030		mg/L	2.3	20	22-SEP-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	22-SEP-18
Uranium (U)-Dissolved		0.00108	0.00112		mg/L	0.1	20	22-SEP-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	22-SEP-18
Zinc (Zn)-Dissolved		0.0061	0.0053		mg/L	0.9	20	22-SEP-18
WG2883937-2 LCS								
Aluminum (Al)-Dissolved			93.8		%		80-120	22-SEP-18
Antimony (Sb)-Dissolved			92.3		%		80-120	22-SEP-18
Arsenic (As)-Dissolved			92.9		%		80-120	22-SEP-18
Barium (Ba)-Dissolved			94.9		%		80-120	22-SEP-18
Bismuth (Bi)-Dissolved			88.2		%		80-120	22-SEP-18
Boron (B)-Dissolved			88.6		%		80-120	22-SEP-18
Cadmium (Cd)-Dissolved			92.1		%		80-120	22-SEP-18
Calcium (Ca)-Dissolved			93.6		%		80-120	22-SEP-18
Chromium (Cr)-Dissolved			93.1		%		80-120	22-SEP-18
Cobalt (Co)-Dissolved			91.8		%		80-120	22-SEP-18
Copper (Cu)-Dissolved			91.8		%		80-120	22-SEP-18
Iron (Fe)-Dissolved			91.0		%		80-120	22-SEP-18
Lead (Pb)-Dissolved			88.7		%		80-120	22-SEP-18
Lithium (Li)-Dissolved			94.8		%		80-120	22-SEP-18
Magnesium (Mg)-Dissolved			91.9		%		80-120	22-SEP-18
Manganese (Mn)-Dissolved			96.4		%		80-120	22-SEP-18
Molybdenum (Mo)-Dissolved			94.8		%		80-120	22-SEP-18
Nickel (Ni)-Dissolved			92.3		%		80-120	22-SEP-18
Potassium (K)-Dissolved			92.7		%		80-120	22-SEP-18
Selenium (Se)-Dissolved			91.0		%		80-120	22-SEP-18
Silicon (Si)-Dissolved			90.2		%		60-140	22-SEP-18
Silver (Ag)-Dissolved			90.7		%		80-120	22-SEP-18
Sodium (Na)-Dissolved			95.7		%		80-120	22-SEP-18
Strontium (Sr)-Dissolved			90.8		%		80-120	22-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4235372								
WG2883937-2 LCS								
Thallium (Tl)-Dissolved			91.6		%		80-120	22-SEP-18
Tin (Sn)-Dissolved			93.3		%		80-120	22-SEP-18
Titanium (Ti)-Dissolved			96.9		%		80-120	22-SEP-18
Uranium (U)-Dissolved			89.2		%		80-120	22-SEP-18
Vanadium (V)-Dissolved			95.5		%		80-120	22-SEP-18
Zinc (Zn)-Dissolved			93.3		%		80-120	22-SEP-18
WG2883937-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	22-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	22-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	22-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	22-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	22-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	22-SEP-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	22-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	22-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	22-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	22-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	22-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	22-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	22-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	22-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	22-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	22-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	22-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	22-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	22-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	22-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	22-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	22-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	22-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	22-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	22-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	22-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	22-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4235372								
WG2883937-1 MB		**NP**						
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	22-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	22-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	22-SEP-18
NH3-L-F-CL	**Water**							
Batch R4231849								
WG2883448-14 LCS								
Ammonia as N			102.1		%		85-115	21-SEP-18
WG2883448-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	21-SEP-18
NO2-L-IC-N-CL	**Water**							
Batch R4230107								
WG2882967-7 DUP		**L2167626-1**						
Nitrite (as N)		0.0100	0.0120		mg/L	18	20	21-SEP-18
WG2882967-6 LCS								
Nitrite (as N)			102.0		%		90-110	20-SEP-18
WG2882967-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	20-SEP-18
WG2882967-8 MS		**L2167626-1**						
Nitrite (as N)			102.7		%		75-125	20-SEP-18
NO3-L-IC-N-CL	**Water**							
Batch R4230107								
WG2882967-7 DUP		**L2167626-1**						
Nitrate (as N)		0.131	0.141		mg/L	7.7	20	20-SEP-18
WG2882967-6 LCS								
Nitrate (as N)			102.8		%		90-110	20-SEP-18
WG2882967-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	20-SEP-18
WG2882967-8 MS		**L2167626-1**						
Nitrate (as N)			98.4		%		75-125	20-SEP-18
ORP-CL	**Water**							
Batch R4235168								
WG2883518-1 CRM		**CL-ORP**						
ORP			227		mV		210-230	21-SEP-18
WG2883518-2 DUP		**L2167626-1**						
ORP		332	338	J	mV	6.2	15	21-SEP-18
P-T-L-COL-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-CL	**Water**							
Batch R4233894								
WG2884245-2 LCS								
Phosphorus (P)-Total			105.8		%		80-120	22-SEP-18
WG2884245-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	22-SEP-18
P-TD-L-COL-CL	**Water**							
Batch R4233894								
WG2884245-2 LCS								
Phosphorus (P)-Total	Dissolved		105.8		%		80-120	22-SEP-18
WG2884245-1 MB								
Phosphorus (P)-Total	Dissolved		<0.0020		mg/L		0.002	22-SEP-18
PO4-DO-L-COL-CL	**Water**							
Batch R4233907								
WG2882992-6 LCS								
Orthophosphate-Dissolved (as P)			102.1		%		80-120	21-SEP-18
WG2882992-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	21-SEP-18
SO4-IC-N-CL	**Water**							
Batch R4230107								
WG2882967-7 DUP		**L2167626-1**						
Sulfate (SO4)		26.7	26.8		mg/L	0.7	20	20-SEP-18
WG2882967-6 LCS								
Sulfate (SO4)			101.6		%		90-110	20-SEP-18
WG2882967-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	20-SEP-18
WG2882967-8 MS		**L2167626-1**						
Sulfate (SO4)			97.1		%		75-125	20-SEP-18
SOLIDS-TDS-CL	**Water**							
Batch R4231308								
WG2881628-11 LCS								
Total Dissolved Solids			98.9		%		85-115	20-SEP-18
WG2881628-10 MB								
Total Dissolved Solids			<10		mg/L		10	20-SEP-18
TKN-L-F-CL	**Water**							
Batch R4231108								
WG2883140-14 LCS								
Total Kjeldahl Nitrogen			81.5		%		75-125	21-SEP-18
WG2883140-13 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-L-F-CL	**Water**							
Batch R4231108								
WG2883140-13 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	21-SEP-18
TSS-L-CL	**Water**							
Batch R4231310								
WG2881745-12 DUP		**L2167626-1**						
Total Suspended Solids		20.3	20.6		mg/L	1.4	20	20-SEP-18
WG2881745-11 LCS								
Total Suspended Solids			95.1		%		85-115	20-SEP-18
WG2881745-10 MB								
Total Suspended Solids			<1.0		mg/L		1	20-SEP-18
TURBIDITY-CL	**Water**							
Batch R4230009								
WG2882094-5 LCS								
Turbidity			99.5		%		85-115	20-SEP-18
WG2882094-4 MB								
Turbidity			<0.10		NTU		0.1	20-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	19-SEP-18 14:45	21-SEP-18 11:49	0.25	45	hours	EHTR-FM
pH							
	1	19-SEP-18 14:45	21-SEP-18 09:00	0.25	42	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2167626 were received on 20-SEP-18 09:05.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2167626-COFC

COC ID:	20180919GW	TU		RUSH:	Priority (2-3 business days)

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations	Lal		stribution	Excel	PDF	EDD
Job Description	Q3 Ground Water Sampling	Lab (		gden@teck.com	X	X	X
Project Manager	Cameron Griffin			l@equisonline.com			X
Email	Cameron.Griffin@Teck.com			Boldt@teck.com	X	X	X
Address	RR#1 HWY# 3			ron.Griffin@teck.com	X	X	X
				Email 5:	TeckLab.Results@sharepoint.teck.com	X	X	X
City	Sparwood	Province BC	City	Calgary	Province AB	PO #	538700
Postal Code	V1C 4C3	Country Canada	Postal Code	T1Y 7B5	Country Canada		
Phone Number	1-250-865-5289		Phone Number	1 403 291 9897			

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTERED / PRESERVED	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorus	D-ULTRA MERCURY (SW6020)	T-ULTRA MERCURY (SW6020)	TKN/TOC (APHA 4500-NORG)	Total Nitrogen for BC (NO2 and NO3)	EPH (C10-C32)	T-Mercury	D-Mercury
									No	No	Yes	Yes		No	No			No	No	Yes
											Nitric	Sulphuric		Sulphuric				Sodium Bisulphate	Nitric	HCl
EV_ECgw_WG_2018-09_NP	EV_ECgw	WG	N	9/19/2018	14:45	G	5		1		1	1				1				1
					Total		5													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Bryan Ogden	September 19, 2018		9/20 9:05

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	
Priority (2-3 business days) - 50% surcharge	X
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Bryan Ogden	Mobile #	
Sampler's Signature		Date/Time	September 19, 2018

6°C

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 10-OCT-18
Report Date: 17-OCT-18 17:06 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2178524

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20181009GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2178524-1	L2178524-2	L2178524-3		
	Description	WG	WG	WG		
	Sampled Date	09-OCT-18	09-OCT-18	09-OCT-18		
	Sampled Time	09:45	14:40	12:45		
	Client ID	EV_ER1GWS_WG_2018-10_NP	EV_ER1GWD_WG_2018-10_NP	EV_LSGW_WG_2018-10_NP		
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0		
	Conductivity (@ 25C) (uS/cm)	453	408	862		
	Hardness (as CaCO3) (mg/L)	233	229	574		
	pH (pH)	8.38	8.16	8.27		
	ORP (mV)	286	310	261		
	Total Suspended Solids (mg/L)	<1.0	21.6	12.3		
	Total Dissolved Solids (mg/L)	290 DLHC	268 DLHC	598 DLHC		
	Turbidity (NTU)	0.18	9.61	40.8		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<2.0	<2.0	2.8		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	169	175	460		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	5.6	<1.0	<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	175	175	460		
	Ammonia as N (mg/L)	<0.0050	0.0272	0.234 DLHC		
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.25 DLHC		
	Chloride (Cl) (mg/L)	3.31	5.14	9.0 DLHC		
	Fluoride (F) (mg/L)	0.207	0.243	0.29 DLHC		
	Ion Balance (%)	92.3	103	111		
	Nitrate (as N) (mg/L)	1.85	0.937	0.078 DLHC		
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0050 DLHC		
	Total Kjeldahl Nitrogen (mg/L)	0.057 TKNI	0.081 TKNI	0.331		
	Total Nitrogen (mg/L)	1.91	1.02	0.409		
	Orthophosphate-Dissolved (as P) (mg/L)	0.0033	0.0018	<0.0010		
	Phosphorus (P)-Total Dissolved (mg/L)	0.0027	0.0021	0.0356		
	Phosphorus (P)-Total (mg/L)	0.0030	0.0260	0.0452		
	Sulfate (SO4) (mg/L)	71.2	40.7	71.0 DLHC		
	Anion Sum (meq/L)	5.21	4.56	10.9		
	Cation Sum (meq/L)	4.81	4.72	12.2		
	Cation - Anion Balance (%)	-4.0	1.7	5.4		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50	<0.50	2.81		
	Total Organic Carbon (mg/L)	<0.50	0.66	3.77		
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	0.0115	<0.0030		
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Arsenic (As)-Dissolved (mg/L)	0.00013	0.00010	0.00279		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2178524-1	L2178524-2	L2178524-3		
	Description	WG	WG	WG		
	Sampled Date	09-OCT-18	09-OCT-18	09-OCT-18		
	Sampled Time	09:45	14:40	12:45		
	Client ID	EV_ER1GWS_WG_2018-10_NP	EV_ER1GWD_WG_2018-10_NP	EV_LSGW_WG_2018-10_NP		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Barium (Ba)-Dissolved (mg/L)	0.101	0.0848	0.202		
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	0.048		
	Cadmium (Cd)-Dissolved (ug/L)	0.0103	0.0051	<0.0050		
	Calcium (Ca)-Dissolved (mg/L)	60.8	58.8	107		
	Chromium (Cr)-Dissolved (mg/L)	0.00028	0.00046	<0.00010		
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	1.20		
	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Iron (Fe)-Dissolved (mg/L)	<0.010	0.012	3.09		
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
	Lithium (Li)-Dissolved (mg/L)	0.0076	0.0077	0.0582		
	Magnesium (Mg)-Dissolved (mg/L)	19.6	20.0	74.5		
	Manganese (Mn)-Dissolved (mg/L)	<0.00010	0.00265	1.14		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.00132	0.00148	0.00251		
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00055	0.00468		
	Potassium (K)-Dissolved (mg/L)	0.829	0.773	4.63		
	Selenium (Se)-Dissolved (ug/L)	10.5	5.99	0.077		
	Silicon (Si)-Dissolved (mg/L)	2.36	3.14	5.11		
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	3.23	2.74	9.00		
	Strontium (Sr)-Dissolved (mg/L)	0.187	0.197	0.463		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	0.000047		
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	0.00118	0.00142	0.00164		
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	0.0013		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2178524-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2178524-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2178524-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2178524-1, -2, -3
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2178524-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

Reference Information

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL	Water	Total Nitrogen (Calculation)	APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-CL	Water	Phosphorus (P)-Total Dissolved	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C.

Reference Information

The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20181009GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4277935								
WG2903592-8 LCS								
Acidity (as CaCO3)			100.9		%		85-115	14-OCT-18
WG2903592-7 MB								
Acidity (as CaCO3)			<2.0		mg/L		4	14-OCT-18
ALK-MAN-CL	**Water**							
Batch R4278531								
WG2903559-17 LCS								
Alkalinity, Total (as CaCO3)			105.0		%		85-115	14-OCT-18
WG2903559-16 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	14-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4276032								
WG2901623-2 LCS								
Beryllium (Be)-Dissolved			97.6		%		80-120	12-OCT-18
WG2901623-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	12-OCT-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4283478								
WG2906208-7 DUP		**L2178524-2**						
Dissolved Organic Carbon		<0.50	<0.50	RPD-NA	mg/L	N/A	20	16-OCT-18
WG2906208-2 LCS								
Dissolved Organic Carbon			98.9		%		80-120	16-OCT-18
WG2906208-6 LCS								
Dissolved Organic Carbon			100.6		%		80-120	16-OCT-18
WG2906208-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	16-OCT-18
WG2906208-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	16-OCT-18
WG2906208-8 MS		**L2178524-3**						
Dissolved Organic Carbon			108.1		%		70-130	16-OCT-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4283478								
WG2906208-7 DUP		**L2178524-2**						
Total Organic Carbon		0.66	0.55		mg/L	18	20	16-OCT-18
WG2906208-2 LCS								
Total Organic Carbon			102.5		%		80-120	16-OCT-18
WG2906208-6 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4283478								
WG2906208-6 LCS								
Total Organic Carbon			105.2		%		80-120	16-OCT-18
WG2906208-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	16-OCT-18
WG2906208-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	16-OCT-18
WG2906208-8 MS		**L2178524-3**						
Total Organic Carbon			109.0		%		70-130	16-OCT-18
COLOUR-TRUE-CL	**Water**							
Batch R4270427								
WG2900081-3 DUP		**L2178524-3**						
Colour, True		<5.0	5.1	RPD-NA	CU	N/A	20	10-OCT-18
WG2900081-2 LCS								
Colour, True			101.6		%		85-115	10-OCT-18
WG2900081-1 MB								
Colour, True			<5.0		CU		5	10-OCT-18
EC-L-PCT-CL	**Water**							
Batch R4278531								
WG2903559-17 LCS								
Conductivity (@ 25C)			97.8		%		90-110	14-OCT-18
WG2903559-16 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	14-OCT-18
HG-D-CVAA-VA	**Water**							
Batch R4273909								
WG2901478-10 LCS								
Mercury (Hg)-Dissolved			98.0		%		80-120	12-OCT-18
WG2901478-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	12-OCT-18
Batch R4280190								
WG2901478-11 DUP		**L2178524-2**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	16-OCT-18
WG2901478-12 MS		**L2178524-1**						
Mercury (Hg)-Dissolved			86.9		%		70-130	16-OCT-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4276032								
WG2901623-2 LCS								
Aluminum (Al)-Dissolved			99.3		%		80-120	12-OCT-18
Antimony (Sb)-Dissolved			95.2		%		80-120	12-OCT-18
Arsenic (As)-Dissolved			94.4		%		80-120	12-OCT-18
Barium (Ba)-Dissolved			94.3		%		80-120	12-OCT-18
Bismuth (Bi)-Dissolved			98.5		%		80-120	12-OCT-18
Boron (B)-Dissolved			93.0		%		80-120	12-OCT-18
Cadmium (Cd)-Dissolved			102.0		%		80-120	12-OCT-18
Calcium (Ca)-Dissolved			94.4		%		80-120	12-OCT-18
Chromium (Cr)-Dissolved			98.2		%		80-120	12-OCT-18
Cobalt (Co)-Dissolved			94.4		%		80-120	12-OCT-18
Copper (Cu)-Dissolved			96.0		%		80-120	12-OCT-18
Iron (Fe)-Dissolved			97.9		%		80-120	12-OCT-18
Lead (Pb)-Dissolved			99.3		%		80-120	12-OCT-18
Lithium (Li)-Dissolved			96.6		%		80-120	12-OCT-18
Magnesium (Mg)-Dissolved			102.2		%		80-120	12-OCT-18
Manganese (Mn)-Dissolved			98.7		%		80-120	12-OCT-18
Molybdenum (Mo)-Dissolved			99.97		%		80-120	12-OCT-18
Nickel (Ni)-Dissolved			98.6		%		80-120	12-OCT-18
Potassium (K)-Dissolved			98.8		%		80-120	12-OCT-18
Selenium (Se)-Dissolved			98.2		%		80-120	12-OCT-18
Silicon (Si)-Dissolved			102.5		%		60-140	12-OCT-18
Silver (Ag)-Dissolved			97.7		%		80-120	12-OCT-18
Sodium (Na)-Dissolved			98.0		%		80-120	12-OCT-18
Strontium (Sr)-Dissolved			95.4		%		80-120	12-OCT-18
Thallium (Tl)-Dissolved			98.8		%		80-120	12-OCT-18
Tin (Sn)-Dissolved			97.8		%		80-120	12-OCT-18
Titanium (Ti)-Dissolved			94.3		%		80-120	12-OCT-18
Uranium (U)-Dissolved			104.9		%		80-120	12-OCT-18
Vanadium (V)-Dissolved			99.9		%		80-120	12-OCT-18
Zinc (Zn)-Dissolved			99.9		%		80-120	12-OCT-18
WG2901623-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	12-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	12-OCT-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	12-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4276032								
WG2901623-1 MB		**NP**						
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	12-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	12-OCT-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	12-OCT-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	12-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	12-OCT-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	12-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	12-OCT-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	12-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	12-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	12-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	12-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	12-OCT-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	12-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	12-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	12-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	12-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	12-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	12-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	12-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	12-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	12-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	12-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	12-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	12-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	12-OCT-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	12-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	12-OCT-18
NH3-L-F-CL	**Water**							
Batch R4281786								
WG2905250-12 DUP		**L2178524-1**						
Ammonia as N		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	16-OCT-18
WG2905250-10 LCS								
Ammonia as N			98.2		%		85-115	16-OCT-18
WG2905250-9 MB								
Ammonia as N			<0.0050		mg/L		0.005	16-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-L-F-CL	**Water**							
Batch R4281786								
WG2905250-11 MS		**L2178524-1**						
Ammonia as N			101.6		%		75-125	16-OCT-18
ORP-CL	**Water**							
Batch R4283698								
WG2906369-5 CRM		**CL-ORP**						
ORP			214		mV		210-230	17-OCT-18
P-T-L-COL-CL	**Water**							
Batch R4277589								
WG2903373-14 LCS								
Phosphorus (P)-Total			95.1		%		80-120	14-OCT-18
WG2903373-13 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	14-OCT-18
P-TD-L-COL-CL	**Water**							
Batch R4277589								
WG2903373-14 LCS								
Phosphorus (P)-Total Dissolved			95.1		%		80-120	14-OCT-18
WG2903373-13 MB								
Phosphorus (P)-Total Dissolved			<0.0020		mg/L		0.002	14-OCT-18
PH-CL	**Water**							
Batch R4278531								
WG2903559-17 LCS								
pH			7.00		pH		6.9-7.1	14-OCT-18
PO4-DO-L-COL-CL	**Water**							
Batch R4274227								
WG2901676-14 LCS								
Orthophosphate-Dissolved (as P)			96.8		%		80-120	11-OCT-18
WG2901676-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	11-OCT-18
SOLIDS-TDS-CL	**Water**							
Batch R4281701								
WG2903588-3 DUP		**L2178524-3**						
Total Dissolved Solids		598	585		mg/L	2.3	20	15-OCT-18
WG2903588-2 LCS								
Total Dissolved Solids			98.7		%		85-115	15-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-CL	**Water**							
Batch R4281701								
WG2903588-5 LCS								
Total Dissolved Solids			102.3		%		85-115	15-OCT-18
WG2903588-1 MB								
Total Dissolved Solids			<10		mg/L		10	15-OCT-18
WG2903588-4 MB								
Total Dissolved Solids			<10		mg/L		10	15-OCT-18
TKN-L-F-CL	**Water**							
Batch R4277199								
WG2901316-3 LCS								
Total Kjeldahl Nitrogen			104.3		%		75-125	13-OCT-18
WG2901316-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	13-OCT-18
TSS-L-CL	**Water**							
Batch R4281621								
WG2903673-6 LCS								
Total Suspended Solids			95.0		%		85-115	15-OCT-18
WG2903673-5 MB								
Total Suspended Solids			<1.0		mg/L		1	15-OCT-18
TURBIDITY-CL	**Water**							
Batch R4270572								
WG2899941-11 LCS								
Turbidity			97.0		%		85-115	10-OCT-18
WG2899941-10 MB								
Turbidity			<0.10		NTU		0.1	10-OCT-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	09-OCT-18 09:45	17-OCT-18 13:00	0.25	195	hours	EHTR-FM
	2	09-OCT-18 14:40	17-OCT-18 13:00	0.25	190	hours	EHTR-FM
	3	09-OCT-18 12:45	17-OCT-18 13:00	0.25	192	hours	EHTR-FM
pH							
	1	09-OCT-18 09:45	14-OCT-18 00:00	0.25	110	hours	EHTR-FM
	2	09-OCT-18 14:40	14-OCT-18 00:00	0.25	105	hours	EHTR-FM
	3	09-OCT-18 12:45	14-OCT-18 00:00	0.25	107	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2178524 were received on 10-OCT-18 09:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	20181009GW	TURNAROU			

L2178524-COFC

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations	Lab Name	AL
Job Description	Q2 Ground Water Sampling	Lab Contact	Ly
Project Manager	Cameron Griffin	Email	Ly
Email	Cameron.Griffin@Teck.com	Address	25
Address	RR#1 HWY# 3		
City	Sparwood, Province BC	City	Calgary, Province AB
Postal Code	V1C 4C3, Country Canada	Postal Code	T1Y 7B5, Country Canada
Phone Number	1-250-865-5289	Phone Number	1 403 291 9897

	Excel	PDF	EDD
com	X	X	X
ne.com			X
com	X	X	X
eck.com	X	X	X
Email 5: ...sharepoint.teck.com	X	X	X

PO # 538700

SAMPLE DETAILS / **ANALYSIS REQUESTED** Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

								FILTERED	No	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes
								PRESERVED			Nitric	Sulphuric	Sulphuric	Sulphuric				Sodium Bisulphate	HCl	HCl
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorus	TKN/TOC (APHA 4500-NORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	Total Nitrogen for BC (NO2 and NO3)	EPH (C10-C32)	T-Mercury	D-Mercury
EV_ER1gwS_WG_2018-10_NP	EV_ER1gwS	WG	N	10/9/2018	9:45	G	5		1		1	1		1			1			1
EV_ER1gwD_WG_2018-10_NP	EV_ER1gwD	WG	N	10/9/2018	14:40	G	5		1		1	1		1			1			1
EV_LSgw_WG_2018-10_NP	EV_LSgw	WG	N	10/9/2018	12:45	G	5		1		1	1		1			1			1
						Total	15													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Ultra-trace Mercury samples are unfiltered and unpreserved
Total Methyl Mercury samples are preserved but unfiltered
Total Selenium samples are preserved but unfiltered
Dissolved Selenium samples are preserved and filtered

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Bryan Ogden	October 9, 2018	[signature]	10/10 9:30

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X	Sampler's Name	Bryan Ogden	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature	[signature]	Date/Time	October 9, 2018
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

6

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 17-OCT-18
Report Date: 25-OCT-18 14:41 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2182223

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20181016GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2182223-1	L2182223-2	L2182223-3		
	Description	WG	WG	WG		
	Sampled Date	16-OCT-18	16-OCT-18	16-OCT-18		
	Sampled Time	13:35	13:25	12:35		
	Client ID	EV_WH50GW_WG_2018-10_NP	EV_RCSGW_WG_2018-10_NP	EV_BRGW_WG_2018-10_NP		
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0		
	Conductivity (@ 25C) (uS/cm)	626	2360	1180		
	Hardness (as CaCO3) (mg/L)	326	1550	678		
	pH (pH)	8.45	8.23	8.10		
	ORP (mV)	349	236	277		
	Total Suspended Solids (mg/L)	2.0	2.9	6.7		
	Total Dissolved Solids (mg/L)	405 DLHC	2060 DLHC	872 DLHC		
	Turbidity (NTU)	2.81	<0.10	4.16		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	15.4	7.0		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	173	247	211		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	9.4	<1.0	<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	182	247	211		
	Ammonia as N (mg/L)	0.0104	0.0098	0.0107		
	Bromide (Br) (mg/L)	0.203	0.34 DLHC	0.141		
	Chloride (Cl) (mg/L)	3.44	14.6 DLHC	21.5		
	Fluoride (F) (mg/L)	0.158	0.20 DLHC	0.128		
	Ion Balance (%)	94.4	95.9	106		
	Nitrate (as N) (mg/L)	2.35	36.5 DLHC	7.10		
	Nitrite (as N) (mg/L)	<0.0010	<0.0050 DLHC	0.0154		
	Total Kjeldahl Nitrogen (mg/L)	0.295	0.603 TKNI	<0.050 TKNI		
	Total Nitrogen (mg/L)	2.65	37.1	7.11		
	Orthophosphate-Dissolved (as P) (mg/L)	0.0059	0.0062	0.0050		
	Phosphorus (P)-Total Dissolved (mg/L)	0.0059	0.0065	0.0048		
	Phosphorus (P)-Total (mg/L)	0.0178	0.0074	0.0082		
	Sulfate (SO4) (mg/L)	154	1190 DLHC	382		
	Anion Sum (meq/L)	7.12	32.7	13.3		
	Cation Sum (meq/L)	6.72	31.4	14.0		
	Cation - Anion Balance (%)	-2.9	-2.1	2.7		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.03	1.15	0.61		
	Total Organic Carbon (mg/L)	0.91	1.11	0.57		
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030		
	Antimony (Sb)-Dissolved (mg/L)	0.00023	0.00022	0.00011		
	Arsenic (As)-Dissolved (mg/L)	<0.00010	0.00016	0.00011		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2182223-1	L2182223-2	L2182223-3		
	Description	WG	WG	WG		
	Sampled Date	16-OCT-18	16-OCT-18	16-OCT-18		
	Sampled Time	13:35	13:25	12:35		
	Client ID	EV_WH50GW_WG_2018-10_NP	EV_RCSGW_WG_2018-10_NP	EV_BRGW_WG_2018-10_NP		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Barium (Ba)-Dissolved (mg/L)	0.151	0.0456	0.0763		
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
	Boron (B)-Dissolved (mg/L)	0.014	0.020	0.039		
	Cadmium (Cd)-Dissolved (ug/L)	0.0202	0.265	0.0525		
	Calcium (Ca)-Dissolved (mg/L)	80.1	349	175		
	Chromium (Cr)-Dissolved (mg/L)	0.00014	0.00018	0.00013		
	Cobalt (Co)-Dissolved (ug/L)	<0.10	0.12	<0.10		
	Copper (Cu)-Dissolved (mg/L)	0.00062	0.0297	<0.00050		
	Iron (Fe)-Dissolved (mg/L)	0.011	<0.010	<0.010		
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000251	<0.000050		
	Lithium (Li)-Dissolved (mg/L)	0.0166	0.0709	0.0602		
	Magnesium (Mg)-Dissolved (mg/L)	30.6	166	58.4		
	Manganese (Mn)-Dissolved (mg/L)	0.00425	0.00117	0.00130		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.00137	0.00131	0.000611		
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00229	0.00192		
	Potassium (K)-Dissolved (mg/L)	1.36	3.79	2.35		
	Selenium (Se)-Dissolved (ug/L)	16.8	216	35.6		
	Silicon (Si)-Dissolved (mg/L)	2.64	4.60	3.33		
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	3.98	6.06	10.1		
	Strontium (Sr)-Dissolved (mg/L)	0.195	0.411	0.359		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000017	0.000013		
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	0.00159	0.00766	0.00190		
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0367	0.0017		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2182223-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2182223-1, -2, -3
Matrix Spike	Copper (Cu)-Dissolved	MS-B	L2182223-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2182223-1, -2, -3
Matrix Spike	Selenium (Se)-Dissolved	MS-B	L2182223-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2182223-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2182223-1, -2, -3
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2182223-1, -2, -3
Matrix Spike	Sulfate (SO4)	MS-B	L2182223-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time

Reference Information

of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-CL Water Phosphorus (P)-Total Dissolved APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Reference Information

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20181016GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4284647								
WG2907097-11 LCS								
Acidity (as CaCO3)			103.4		%		85-115	17-OCT-18
WG2907097-10 MB								
Acidity (as CaCO3)			<2.0		mg/L		4	17-OCT-18
ALK-MAN-CL	**Water**							
Batch R4292487								
WG2910195-5 LCS								
Alkalinity, Total (as CaCO3)			100.5		%		85-115	20-OCT-18
WG2910195-8 LCS								
Alkalinity, Total (as CaCO3)			102.7		%		85-115	20-OCT-18
WG2910195-4 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	20-OCT-18
WG2910195-7 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	20-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4289319								
WG2908100-2 LCS								
Beryllium (Be)-Dissolved			92.0		%		80-120	19-OCT-18
WG2908100-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	19-OCT-18
WG2908100-4 MS		**L2182223-2**						
Beryllium (Be)-Dissolved			91.8		%		70-130	19-OCT-18
BR-L-IC-N-CL	**Water**							
Batch R4284787								
WG2907285-11 DUP		**L2182223-1**						
Bromide (Br)		0.203	0.217		mg/L	6.4	20	17-OCT-18
WG2907285-10 LCS								
Bromide (Br)			99.3		%		85-115	17-OCT-18
WG2907285-6 LCS								
Bromide (Br)			101.8		%		85-115	17-OCT-18
WG2907285-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	17-OCT-18
WG2907285-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	17-OCT-18
WG2907285-12 MS		**L2182223-1**						
Bromide (Br)			117.1		%		75-125	17-OCT-18
C-DIS-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R4297167								
WG2912867-2 LCS								
Dissolved Organic Carbon			98.7		%		80-120	23-OCT-18
WG2912867-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	23-OCT-18
Batch R4297309								
WG2912904-2 LCS								
Dissolved Organic Carbon			106.9		%		80-120	23-OCT-18
WG2912904-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	23-OCT-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4297167								
WG2912867-2 LCS								
Total Organic Carbon			105.1		%		80-120	23-OCT-18
WG2912867-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-OCT-18
Batch R4297309								
WG2912904-2 LCS								
Total Organic Carbon			110.7		%		80-120	23-OCT-18
WG2912904-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-OCT-18
CL-IC-N-CL	**Water**							
Batch R4284787								
WG2907285-11 DUP		**L2182223-1**						
Chloride (Cl)		3.44	3.45		mg/L	0.1	20	17-OCT-18
WG2907285-10 LCS								
Chloride (Cl)			100.4		%		90-110	17-OCT-18
WG2907285-6 LCS								
Chloride (Cl)			100.4		%		90-110	17-OCT-18
WG2907285-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	17-OCT-18
WG2907285-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	17-OCT-18
WG2907285-12 MS		**L2182223-1**						
Chloride (Cl)			113.7		%		75-125	17-OCT-18
COLOUR-TRUE-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COLOUR-TRUE-CL	**Water**							
Batch R4288989								
WG2908832-3 DUP		**L2182223-1**						
Colour, True		<5.0	<5.0	RPD-NA	CU	N/A	20	19-OCT-18
WG2908832-2 LCS								
Colour, True			101.9		%		85-115	19-OCT-18
WG2908832-1 MB								
Colour, True			<5.0		CU		5	19-OCT-18
EC-L-PCT-CL	**Water**							
Batch R4292487								
WG2910195-5 LCS								
Conductivity (@ 25C)			98.1		%		90-110	20-OCT-18
WG2910195-8 LCS								
Conductivity (@ 25C)			100.0		%		90-110	20-OCT-18
WG2910195-4 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	20-OCT-18
WG2910195-7 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	20-OCT-18
F-IC-N-CL	**Water**							
Batch R4284787								
WG2907285-11 DUP		**L2182223-1**						
Fluoride (F)		0.158	0.156		mg/L	1.0	20	17-OCT-18
WG2907285-10 LCS								
Fluoride (F)			104.8		%		90-110	17-OCT-18
WG2907285-6 LCS								
Fluoride (F)			105.3		%		90-110	17-OCT-18
WG2907285-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	17-OCT-18
WG2907285-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	17-OCT-18
WG2907285-12 MS		**L2182223-1**						
Fluoride (F)			115.7		%		75-125	17-OCT-18
HG-D-CVAA-VA	**Water**							
Batch R4290008								
WG2908022-2 LCS								
Mercury (Hg)-Dissolved			84.9		%		80-120	21-OCT-18
WG2908022-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	21-OCT-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4289319								
WG2908100-2 LCS								
Aluminum (Al)-Dissolved			104.5		%		80-120	19-OCT-18
Antimony (Sb)-Dissolved			101.1		%		80-120	19-OCT-18
Arsenic (As)-Dissolved			103.0		%		80-120	19-OCT-18
Barium (Ba)-Dissolved			109.7		%		80-120	19-OCT-18
Bismuth (Bi)-Dissolved			106.1		%		80-120	19-OCT-18
Boron (B)-Dissolved			89.7		%		80-120	19-OCT-18
Cadmium (Cd)-Dissolved			103.1		%		80-120	19-OCT-18
Calcium (Ca)-Dissolved			93.1		%		80-120	19-OCT-18
Chromium (Cr)-Dissolved			97.7		%		80-120	19-OCT-18
Cobalt (Co)-Dissolved			100.5		%		80-120	19-OCT-18
Copper (Cu)-Dissolved			99.4		%		80-120	19-OCT-18
Iron (Fe)-Dissolved			95.6		%		80-120	19-OCT-18
Lead (Pb)-Dissolved			101.0		%		80-120	19-OCT-18
Lithium (Li)-Dissolved			90.2		%		80-120	19-OCT-18
Magnesium (Mg)-Dissolved			97.0		%		80-120	19-OCT-18
Manganese (Mn)-Dissolved			101.7		%		80-120	19-OCT-18
Molybdenum (Mo)-Dissolved			97.4		%		80-120	19-OCT-18
Nickel (Ni)-Dissolved			101.7		%		80-120	19-OCT-18
Potassium (K)-Dissolved			112.5		%		80-120	19-OCT-18
Selenium (Se)-Dissolved			100.5		%		80-120	19-OCT-18
Silicon (Si)-Dissolved			99.9		%		60-140	19-OCT-18
Silver (Ag)-Dissolved			94.8		%		80-120	19-OCT-18
Sodium (Na)-Dissolved			104.0		%		80-120	19-OCT-18
Strontium (Sr)-Dissolved			97.3		%		80-120	19-OCT-18
Thallium (Tl)-Dissolved			109.4		%		80-120	19-OCT-18
Tin (Sn)-Dissolved			96.2		%		80-120	19-OCT-18
Titanium (Ti)-Dissolved			99.4		%		80-120	19-OCT-18
Uranium (U)-Dissolved			102.1		%		80-120	19-OCT-18
Vanadium (V)-Dissolved			102.8		%		80-120	19-OCT-18
Zinc (Zn)-Dissolved			98.9		%		80-120	19-OCT-18
WG2908100-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	19-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4289319								
WG2908100-1 MB		**NP**						
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	19-OCT-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	19-OCT-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	19-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	19-OCT-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	19-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	19-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	19-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	19-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	19-OCT-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	19-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	19-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	19-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	19-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	19-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	19-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	19-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	19-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	19-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	19-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	19-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	19-OCT-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	19-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	19-OCT-18
WG2908100-4 MS		**L2182223-2**						
Aluminum (Al)-Dissolved			96.4		%		70-130	19-OCT-18
Antimony (Sb)-Dissolved			99.0		%		70-130	19-OCT-18
Arsenic (As)-Dissolved			103.4		%		70-130	19-OCT-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	19-OCT-18
Bismuth (Bi)-Dissolved			91.0		%		70-130	19-OCT-18
Boron (B)-Dissolved			89.1		%		70-130	19-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4289319								
WG2908100-4 MS		**L2182223-2**						
Cadmium (Cd)-Dissolved			97.8		%		70-130	19-OCT-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	19-OCT-18
Chromium (Cr)-Dissolved			93.8		%		70-130	19-OCT-18
Cobalt (Co)-Dissolved			93.3		%		70-130	19-OCT-18
Copper (Cu)-Dissolved			N/A	MS-B	%		-	19-OCT-18
Iron (Fe)-Dissolved			93.9		%		70-130	19-OCT-18
Lead (Pb)-Dissolved			97.0		%		70-130	19-OCT-18
Lithium (Li)-Dissolved			86.4		%		70-130	19-OCT-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	19-OCT-18
Manganese (Mn)-Dissolved			94.0		%		70-130	19-OCT-18
Molybdenum (Mo)-Dissolved			97.6		%		70-130	19-OCT-18
Nickel (Ni)-Dissolved			90.9		%		70-130	19-OCT-18
Potassium (K)-Dissolved			95.1		%		70-130	19-OCT-18
Selenium (Se)-Dissolved			N/A	MS-B	%		-	19-OCT-18
Silicon (Si)-Dissolved			97.2		%		70-130	19-OCT-18
Silver (Ag)-Dissolved			95.3		%		70-130	19-OCT-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	19-OCT-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	19-OCT-18
Thallium (Tl)-Dissolved			97.9		%		70-130	19-OCT-18
Tin (Sn)-Dissolved			97.2		%		70-130	19-OCT-18
Titanium (Ti)-Dissolved			96.6		%		70-130	19-OCT-18
Uranium (U)-Dissolved			N/A	MS-B	%		-	19-OCT-18
Vanadium (V)-Dissolved			99.4		%		70-130	19-OCT-18
Zinc (Zn)-Dissolved			91.6		%		70-130	19-OCT-18
NH3-L-F-CL	**Water**							
Batch R4295198								
WG2911823-2 LCS								
Ammonia as N			98.5		%		85-115	23-OCT-18
WG2911823-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	23-OCT-18
NO2-L-IC-N-CL	**Water**							
Batch R4284787								
WG2907285-11 DUP		**L2182223-1**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	17-OCT-18
WG2907285-10 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-CL	**Water**							
Batch R4284787								
WG2907285-10 LCS								
Nitrite (as N)			104.8		%		90-110	17-OCT-18
WG2907285-6 LCS								
Nitrite (as N)			104.8		%		90-110	17-OCT-18
WG2907285-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	17-OCT-18
WG2907285-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	17-OCT-18
WG2907285-12 MS		**L2182223-1**						
Nitrite (as N)			116.5		%		75-125	17-OCT-18
NO3-L-IC-N-CL	**Water**							
Batch R4284787								
WG2907285-11 DUP		**L2182223-1**						
Nitrate (as N)		2.35	2.36		mg/L	0.5	20	17-OCT-18
WG2907285-10 LCS								
Nitrate (as N)			100.1		%		90-110	17-OCT-18
WG2907285-6 LCS								
Nitrate (as N)			100.1		%		90-110	17-OCT-18
WG2907285-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	17-OCT-18
WG2907285-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	17-OCT-18
WG2907285-12 MS		**L2182223-1**						
Nitrate (as N)			112.8		%		75-125	17-OCT-18
ORP-CL	**Water**							
Batch R4290007								
WG2909894-4 CRM		**CL-ORP**						
ORP			217		mV		210-230	20-OCT-18
WG2909894-5 CRM		**CL-ORP**						
ORP			213		mV		210-230	20-OCT-18
P-T-L-COL-CL	**Water**							
Batch R4288870								
WG2908376-6 LCS								
Phosphorus (P)-Total			104.6		%		80-120	19-OCT-18
WG2908376-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	19-OCT-18
P-TD-L-COL-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-TD-L-COL-CL	**Water**							
Batch R4289779								
WG2909547-6 LCS								
Phosphorus (P)-Total	Dissolved		100.9		%		80-120	20-OCT-18
WG2909547-5 MB								
Phosphorus (P)-Total	Dissolved		<0.0020		mg/L		0.002	20-OCT-18
PH-CL	**Water**							
Batch R4292487								
WG2910195-5 LCS								
pH			7.00		pH		6.9-7.1	20-OCT-18
WG2910195-8 LCS								
pH			6.99		pH		6.9-7.1	20-OCT-18
PO4-DO-L-COL-CL	**Water**							
Batch R4285867								
WG2907305-27 DUP		**L2182223-1**						
Orthophosphate-Dissolved (as P)		0.0059	0.0057		mg/L	3.5	20	18-OCT-18
WG2907305-18 LCS								
Orthophosphate-Dissolved (as P)			103.0		%		80-120	17-OCT-18
WG2907305-26 LCS								
Orthophosphate-Dissolved (as P)			99.9		%		80-120	17-OCT-18
WG2907305-17 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-OCT-18
WG2907305-25 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	17-OCT-18
WG2907305-28 MS		**L2182223-1**						
Orthophosphate-Dissolved (as P)			108.5		%		70-130	18-OCT-18
SO4-IC-N-CL	**Water**							
Batch R4284787								
WG2907285-11 DUP		**L2182223-1**						
Sulfate (SO4)		154	154		mg/L	0.2	20	17-OCT-18
WG2907285-10 LCS								
Sulfate (SO4)			101.0		%		90-110	17-OCT-18
WG2907285-6 LCS								
Sulfate (SO4)			101.0		%		90-110	17-OCT-18
WG2907285-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	17-OCT-18
WG2907285-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	17-OCT-18
WG2907285-12 MS		**L2182223-1**						
Sulfate (SO4)			N/A	MS-B	%		-	17-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-CL	**Water**							
Batch R4295238								
WG2909793-2 LCS								
Total Dissolved Solids			97.0		%		85-115	21-OCT-18
WG2909793-1 MB								
Total Dissolved Solids			<10		mg/L		10	21-OCT-18
TKN-L-F-CL	**Water**							
Batch R4289276								
WG2906457-10 LCS								
Total Kjeldahl Nitrogen			105.8		%		75-125	19-OCT-18
WG2906457-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	19-OCT-18
TSS-L-CL	**Water**							
Batch R4296280								
WG2911332-20 LCS								
Total Suspended Solids			100.1		%		85-115	23-OCT-18
WG2911332-19 MB								
Total Suspended Solids			<1.0		mg/L		1	23-OCT-18
TURBIDITY-CL	**Water**							
Batch R4289142								
WG2907648-3 DUP		**L2182223-3**						
Turbidity		4.16	4.12		NTU	1.0	15	18-OCT-18
WG2907648-2 LCS								
Turbidity			97.0		%		85-115	18-OCT-18
WG2907648-1 MB								
Turbidity			<0.10		NTU		0.1	18-OCT-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	16-OCT-18 13:35	20-OCT-18 14:30	0.25	97	hours	EHTR-FM
	2	16-OCT-18 13:25	20-OCT-18 14:30	0.25	97	hours	EHTR-FM
	3	16-OCT-18 12:35	20-OCT-18 14:30	0.25	98	hours	EHTR-FM
pH							
	1	16-OCT-18 13:35	20-OCT-18 00:00	0.25	82	hours	EHTR-FM
	2	16-OCT-18 13:25	20-OCT-18 00:00	0.25	83	hours	EHTR-FM
	3	16-OCT-18 12:35	20-OCT-18 00:00	0.25	84	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2182223 were received on 17-OCT-18 09:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 20181016GW | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q4 Ground Water Sampling			Lab Contact	Lyudmyla Shvets			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cameron Griffin			Email	Lyudmyla.Shvets@alsglobal.com			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.Griffin@Teck.com			Address	2559 29 St NE,			Email 3:	James.Bolen@teck.com	X	X	X
Address	RR#1 HWY# 3							Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO #	5387700			
Postal Code	V1C 4C3	Country	Canada	Postal Code	T1Y 7B5	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	1 403 291 9897							

SAMPLE DETAILS — ANALYSIS REQUESTED

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont	FILTERED	No	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes
								PRESERVED			Nitric	Sulphuric	Sulphuric	Sulphuric					Sodium Hydroxide	HCl	HCl
								ANALYSIS	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorus	TKN/TOC (APHA 4500-NORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	Total Nitrogen for BC (NO2 and NO3)	EPH (C10-C32)	T-Mercury	D-Mercury
EV_WH50gw_WG_2018-10_NP	EV_WH50gw	WG	N	10/16/2018	13:35	G	5		1		1		1	1			1			1
EV_RCSgw_WG_2018-10_NP	EV_RCSgw	WG	N	10/16/2018	13:25	G	5		1		1		1	1			1			1
EV_BRgw_WG_2018-10_NP	EV_BRgw	WG	N	10/16/2018	12:35	G	5		1		1		1	1			1			1
					Total		15													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Ultra-trace Mercury samples are unfiltered and unpreserved	Kimberley Hackett	October 16, 2018	AK	17/Oct/18 0930
Total Methyl Mercury samples are preserved but unfiltered				
Total Selenium samples are preserved but unfiltered				
Dissolved Selenium samples are preserved and filtered				

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Kimberley Hackett	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	October 16, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

6°C

L2182223

L2182223-COFC

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 18-OCT-18
Report Date: 29-OCT-18 14:18 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2183335

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20181017GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2183335-1	L2183335-2	L2183335-3	L2183335-4	L2183335-5
	Description	WG	WG	WG	WG	WG
	Sampled Date	17-OCT-18	17-OCT-18	17-OCT-18	17-OCT-18	17-OCT-18
	Sampled Time	14:10	14:15	14:20	14:05	14:05
	Client ID	EV_MC5GW_WG_2018-10_NP	EV_MC6GW_WG_2018-10_NP	EV_MC7GW_WG_2018-10_NP	EV_OCGW_WG_2018-10_NP	EV_OCGW_WG_2018-10_FB-HG
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	
	Conductivity (@ 25C) (uS/cm)	482	<2.0	<2.0	440	
	Hardness (as CaCO3) (mg/L)	149	<0.50		149	
	pH (pH)	8.31	5.68	5.63	8.04	
	ORP (mV)	368	472	345	279	
	Total Suspended Solids (mg/L)	1.1	<1.0	<1.0	<1.0	
	Total Dissolved Solids (mg/L)	281 DLHC	<10	<10	278 DLHC	
	Turbidity (NTU)	2.35	<0.10	<0.10	2.17	
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	1.8	1.8	<1.0	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	188	<1.0	<1.0	206	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	4.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	192	<1.0	<1.0	206	
	Ammonia as N (mg/L)	0.0884	0.0285	0.0171 RRV	0.0863	
	Bromide (Br) (mg/L)	0.070	<0.050	<0.050	0.064	
	Chloride (Cl) (mg/L)	2.19	<0.50	<0.50	2.10	
	Fluoride (F) (mg/L)	1.15	<0.020	<0.020	1.16	
	Ion Balance (%)	94.5	0.0	0.0	90.3	
	Nitrate (as N) (mg/L)	0.0114	<0.0050	<0.0050 HTD	<0.0050	
	Nitrite (as N) (mg/L)	0.0015	<0.0010	<0.0010 HTD	0.0014	
	Total Kjeldahl Nitrogen (mg/L)	0.124	0.052	0.102	0.149	
	Total Nitrogen (mg/L)	0.137	0.052	0.102	0.150	
	Orthophosphate-Dissolved (as P) (mg/L)	0.0084	0.0014	0.0011	0.0083	
	Phosphorus (P)-Total Dissolved (mg/L)	0.0190	0.0031		0.0181	
	Phosphorus (P)-Total (mg/L)	0.0212	0.0029	0.0026	0.0210	
	Sulfate (SO4) (mg/L)	65.1	<0.30	<0.30	64.5	
	Anion Sum (meq/L)	5.32	<0.10	<0.10	5.59	
	Cation Sum (meq/L)	5.03	<0.10	<0.10	5.05	
	Cation - Anion Balance (%)	-2.8	0.0	0.0	-5.1	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50	<0.50		<0.50	
	Total Organic Carbon (mg/L)	<0.50	<0.50	<0.50	<0.50	
Total Metals	Mercury (Hg)-Total (ug/L)			<0.00050		
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD		FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	LAB	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030		<0.0030	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010		<0.00010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2183335-6	L2183335-7	L2183335-8	L2183335-9	
	Description	WG	WG	WG	WG	
	Sampled Date	17-OCT-18	17-OCT-18	17-OCT-18	17-OCT-18	
	Sampled Time	11:50	11:50	12:35	12:35	
	Client ID	EV_MCGWS_WG_2018-10_NP	EV_MCGWS_WG_2018-10_FB-HG	EV_MCGWD_WG_2018-10_NP	EV_MCGWD_WG_2018-10_FB-HG	
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0		<5.0		
	Conductivity (@ 25C) (uS/cm)	801		540		
	Hardness (as CaCO3) (mg/L)	367		240		
	pH (pH)	7.91		8.07		
	ORP (mV)	419		303		
	Total Suspended Solids (mg/L)	9.0		156		
	Total Dissolved Solids (mg/L)	527 DLHC		349 DLHC		
	Turbidity (NTU)	18.5		103		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0		<1.0		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	271		259		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0		<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0		<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	271		259		
	Ammonia as N (mg/L)	0.180		0.0762		
	Bromide (Br) (mg/L)	0.257		0.082		
	Chloride (Cl) (mg/L)	42.6		3.67		
	Fluoride (F) (mg/L)	0.446		0.998		
	Ion Balance (%)	93.3		92.9		
	Nitrate (as N) (mg/L)	0.104		0.0794		
	Nitrite (as N) (mg/L)	0.0069		0.0043		
	Total Kjeldahl Nitrogen (mg/L)	0.305		0.394		
	Total Nitrogen (mg/L)	0.415		0.478		
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010		0.0051		
	Phosphorus (P)-Total Dissolved (mg/L)	0.0041		0.0070		
	Phosphorus (P)-Total (mg/L)	0.0136		0.225		
	Sulfate (SO4) (mg/L)	161		69.3		
	Anion Sum (meq/L)	10.0		6.78		
	Cation Sum (meq/L)	9.33		6.30		
	Cation - Anion Balance (%)	-3.5		-3.7		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.15		2.17		
	Total Organic Carbon (mg/L)	2.47		1.82		
Total Metals	Mercury (Hg)-Total (ug/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD		FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0030		<0.0030		
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		0.00014		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2183335-1	L2183335-2	L2183335-3	L2183335-4	L2183335-5
	Description	WG	WG	WG	WG	WG
	Sampled Date	17-OCT-18	17-OCT-18	17-OCT-18	17-OCT-18	17-OCT-18
	Sampled Time	14:10	14:15	14:20	14:05	14:05
	Client ID	EV_MC5GW_WG_2018-10_NP	EV_MC6GW_WG_2018-10_NP	EV_MC7GW_WG_2018-10_NP	EV_OCGW_WG_2018-10_NP	EV_OCGW_WG_2018-10_FB-HG
Grouping	**Analyte**					
WATER						
Dissolved Metals	Arsenic (As)-Dissolved (mg/L)	0.00147	<0.00010		0.00149	
	Barium (Ba)-Dissolved (mg/L)	0.0541	0.00014 RRV		0.0543	
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020		<0.020	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050		<0.000050	
	Boron (B)-Dissolved (mg/L)	0.131	<0.010		0.133	
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050		<0.0050	
	Calcium (Ca)-Dissolved (mg/L)	28.4	<0.050	<0.050	28.2	
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010		<0.00010	
	Cobalt (Co)-Dissolved (ug/L)	0.10	<0.10		<0.10	
	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050		<0.00050	
	Iron (Fe)-Dissolved (mg/L)	0.322	<0.010		0.330	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050		<0.000050	
	Lithium (Li)-Dissolved (mg/L)	0.0266	<0.0010		0.0267	
	Magnesium (Mg)-Dissolved (mg/L)	18.9	<0.10	<0.0050	19.1	
	Manganese (Mn)-Dissolved (mg/L)	0.0846	<0.00010		0.0855	
	Mercury (Hg)-Dissolved (ug/L)	<0.00050	<0.00050		<0.00050	<0.00050
	Molybdenum (Mo)-Dissolved (mg/L)	0.0144	<0.000050		0.0145	
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050		<0.00050	
	Potassium (K)-Dissolved (mg/L)	1.58	<0.050	<0.050	1.59	
	Selenium (Se)-Dissolved (ug/L)	<0.050	<0.050		<0.050	
	Silicon (Si)-Dissolved (mg/L)	4.61	<0.050		4.58	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010		<0.000010	
	Sodium (Na)-Dissolved (mg/L)	45.6	<0.050	<0.050	46.0	
	Strontium (Sr)-Dissolved (mg/L)	0.387	<0.00020		0.392	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010		<0.000010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010		<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010		<0.010	
	Uranium (U)-Dissolved (mg/L)	0.00109	<0.000010		0.00109	
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050		<0.00050	
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010		<0.0010	
Hydrocarbons	EPH10-19 (mg/L)	<0.25	<0.25	<0.25	<0.25	
	EPH (C10-C32) (mg/L)	<0.50	<0.50	<0.50	<0.50	
	EPH19-32 (mg/L)	<0.25	<0.25	<0.25	<0.25	
	TEH (C10-C30) (mg/L)	<0.25	<0.25	<0.25	<0.25	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2183335-6	L2183335-7	L2183335-8	L2183335-9	
	Description	WG	WG	WG	WG	
	Sampled Date	17-OCT-18	17-OCT-18	17-OCT-18	17-OCT-18	
	Sampled Time	11:50	11:50	12:35	12:35	
	Client ID	EV_MCGWS_WG_2018-10_NP	EV_MCGWS_WG_2018-10_FB-HG	EV_MCGWD_WG_2018-10_NP	EV_MCGWD_WG_2018-10_FB-HG	
Grouping	**Analyte**					
WATER						
Dissolved Metals	Arsenic (As)-Dissolved (mg/L)	0.00122		0.00047		
	Barium (Ba)-Dissolved (mg/L)	0.0251		0.0668		
	Beryllium (Be)-Dissolved (ug/L)	<0.020		<0.020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		
	Boron (B)-Dissolved (mg/L)	0.031		0.076		
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050		0.0627		
	Calcium (Ca)-Dissolved (mg/L)	92.1		52.3		
	Chromium (Cr)-Dissolved (mg/L)	0.00035		0.00014		
	Cobalt (Co)-Dissolved (ug/L)	0.12		0.19		
	Copper (Cu)-Dissolved (mg/L)	<0.00050		0.00208		
	Iron (Fe)-Dissolved (mg/L)	1.56		<0.010		
	Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050		
	Lithium (Li)-Dissolved (mg/L)	0.0252		0.0097		
	Magnesium (Mg)-Dissolved (mg/L)	33.4		26.5		
	Manganese (Mn)-Dissolved (mg/L)	0.133		0.164		
	Mercury (Hg)-Dissolved (ug/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Molybdenum (Mo)-Dissolved (mg/L)	0.00395		0.0155		
	Nickel (Ni)-Dissolved (mg/L)	0.00082		0.00502		
	Potassium (K)-Dissolved (mg/L)	1.96		1.42		
	Selenium (Se)-Dissolved (ug/L)	<0.050		0.231		
	Silicon (Si)-Dissolved (mg/L)	5.49		5.05		
	Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		
	Sodium (Na)-Dissolved (mg/L)	42.3		33.6		
	Strontium (Sr)-Dissolved (mg/L)	0.313		0.483		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010		0.000062		
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		
	Uranium (U)-Dissolved (mg/L)	0.00203		0.00303		
	Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	<0.0010		0.0088		
Hydrocarbons	EPH10-19 (mg/L)					
	EPH (C10-C32) (mg/L)					
	EPH19-32 (mg/L)					
	TEH (C10-C30) (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2183335-3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2183335-3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2183335-3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2183335-3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2183335-1, -2, -4, -6, -8
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2183335-1, -2, -4, -6, -8
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2183335-1, -2, -4, -6, -8
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2183335-1, -2, -4, -6, -8
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2183335-1, -2, -4, -6, -8
Matrix Spike	Ammonia as N	MS-B	L2183335-1, -2, -3, -4, -6, -8

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

Reference Information

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

EPH(10-32)-CALC-CL Water Sum of EPH (10-32) Sum of EPH - Auto Calculated

The sum of EPH(C10-C19) and EPH(C19-C32)

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-U-CVAF-VA Water Diss. Mercury in Water by CVAFS (Ultra) APHA 3030 B / EPA 1631 REV. E

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure may involve preliminary sample treatment by filtration (APHA 3030B) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-CL Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

Reference Information

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-CL	Water	Phosphorus (P)-Total Dissolved	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TEH-BC-VA-CL	Water	EPH (C10-C19) & EPH (C19-C32)	BCMOE EPH GCFID

Analysis is in accordance with BC MOE Lab Manual method "Extractable Petroleum Hydrocarbons in Water by GC/FID", v2.1, July 1999. Whole water samples are extracted with DCM prior to gas chromatography with flame ionization detection (GC-FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

TEH-WATER-VA-CL	Water	TEH (C10-C30)	EPA 3510/8000-GC-FID
TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20181017GW

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4294875								
WG2911230-11 LCS								
Acidity (as CaCO3)			110.6		%		85-115	22-OCT-18
WG2911230-10 MB								
Acidity (as CaCO3)			1.8		mg/L		2	22-OCT-18
Batch R4296288								
WG2912602-2 LCS								
Acidity (as CaCO3)			106.4		%		85-115	24-OCT-18
WG2912602-1 MB								
Acidity (as CaCO3)			1.8		mg/L		2	24-OCT-18
ALK-MAN-CL	**Water**							
Batch R4292115								
WG2910202-11 LCS								
Alkalinity, Total (as CaCO3)			100.5		%		85-115	21-OCT-18
WG2910202-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	21-OCT-18
Batch R4299672								
WG2914398-2 LCS								
Alkalinity, Total (as CaCO3)			107.2		%		85-115	25-OCT-18
WG2914398-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	25-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4295717								
WG2911078-3 DUP		**L2183335-4**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	23-OCT-18
WG2911078-2 LCS								
Beryllium (Be)-Dissolved			101.4		%		80-120	23-OCT-18
WG2911078-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	23-OCT-18
BR-L-IC-N-CL	**Water**							
Batch R4295137								
WG2911876-3 DUP		**L2183335-2**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2911876-2 LCS								
Bromide (Br)			109.0		%		85-115	20-OCT-18
WG2911876-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	20-OCT-18
WG2911876-4 MS		**L2183335-2**						
Bromide (Br)			107.3		%		75-125	20-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R4301533								
WG2915510-2 LCS								
Dissolved Organic Carbon			101.9		%		80-120	25-OCT-18
WG2915510-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	25-OCT-18
Batch R4302188								
WG2916225-2 LCS								
Dissolved Organic Carbon			102.1		%		80-120	27-OCT-18
WG2916225-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	27-OCT-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4299000								
WG2913896-2 LCS								
Total Organic Carbon			96.4		%		80-120	24-OCT-18
WG2913896-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	24-OCT-18
Batch R4301533								
WG2915510-2 LCS								
Total Organic Carbon			107.3		%		80-120	25-OCT-18
WG2915510-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	25-OCT-18
WG2915510-4 MS		**L2183335-8**						
Total Organic Carbon			91.5		%		70-130	26-OCT-18
Batch R4302188								
WG2916225-2 LCS								
Total Organic Carbon			108.2		%		80-120	27-OCT-18
WG2916225-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	27-OCT-18
CL-IC-N-CL	**Water**							
Batch R4295137								
WG2911876-3 DUP		**L2183335-2**						
Chloride (Cl)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2911876-2 LCS								
Chloride (Cl)			100.0		%		90-110	20-OCT-18
WG2911876-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	20-OCT-18
WG2911876-4 MS		**L2183335-2**						
Chloride (Cl)			98.6		%		75-125	20-OCT-18
COLOUR-TRUE-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COLOUR-TRUE-CL	**Water**							
Batch R4288989								
WG2908832-2 LCS								
Colour, True			101.9		%		85-115	19-OCT-18
WG2908832-1 MB								
Colour, True			<5.0		CU		5	19-OCT-18
EC-L-PCT-CL	**Water**							
Batch R4292115								
WG2910202-11 LCS								
Conductivity (@ 25C)			99.1		%		90-110	21-OCT-18
WG2910202-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	21-OCT-18
Batch R4299672								
WG2914398-2 LCS								
Conductivity (@ 25C)			98.2		%		90-110	25-OCT-18
WG2914398-1 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	25-OCT-18
F-IC-N-CL	**Water**							
Batch R4295137								
WG2911876-3 DUP		**L2183335-2**						
Fluoride (F)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2911876-2 LCS								
Fluoride (F)			96.7		%		90-110	20-OCT-18
WG2911876-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	20-OCT-18
WG2911876-4 MS		**L2183335-2**						
Fluoride (F)			97.8		%		75-125	20-OCT-18
HG-D-U-CVAF-VA	**Water**							
Batch R4297381								
WG2909322-3 DUP		**L2183335-2**						
Mercury (Hg)-Dissolved		<0.00050	<0.00050	RPD-NA	ug/L	N/A	20	24-OCT-18
WG2912900-2 LCS								
Mercury (Hg)-Dissolved			97.9		%		80-120	24-OCT-18
WG2912900-1 MB								
Mercury (Hg)-Dissolved			<0.00050		ug/L		0.0005	24-OCT-18
WG2909322-4 MS		**L2183335-1**						
Mercury (Hg)-Dissolved			86.8		%		70-130	24-OCT-18
HG-T-U-CVAF-VA	**Water**							

Quality Control Report

Workorder: L2183335 Report Date: 29-OCT-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-U-CVAF-VA	**Water**							
Batch R4297381								
WG2912900-2 LCS								
Mercury (Hg)-Total			97.9		%		80-120	24-OCT-18
WG2912900-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	24-OCT-18
MET-D-CCMS-CL	**Water**							
Batch R4295018								
WG2911717-10 LCS		**TMRM**						
Calcium (Ca)-Dissolved			90.8		%		80-120	23-OCT-18
Magnesium (Mg)-Dissolved			93.9		%		80-120	23-OCT-18
Potassium (K)-Dissolved			93.8		%		80-120	23-OCT-18
Sodium (Na)-Dissolved			98.9		%		80-120	23-OCT-18
WG2911717-14 LCS		**TMRM**						
Calcium (Ca)-Dissolved			97.4		%		80-120	23-OCT-18
Magnesium (Mg)-Dissolved			97.3		%		80-120	23-OCT-18
Potassium (K)-Dissolved			94.3		%		80-120	23-OCT-18
Sodium (Na)-Dissolved			95.6		%		80-120	23-OCT-18
WG2911717-2 LCS		**TMRM**						
Calcium (Ca)-Dissolved			96.1		%		80-120	23-OCT-18
Magnesium (Mg)-Dissolved			93.9		%		80-120	23-OCT-18
Potassium (K)-Dissolved			88.4		%		80-120	23-OCT-18
Sodium (Na)-Dissolved			99.97		%		80-120	23-OCT-18
WG2911717-6 LCS		**TMRM**						
Calcium (Ca)-Dissolved			93.9		%		80-120	23-OCT-18
Magnesium (Mg)-Dissolved			92.2		%		80-120	23-OCT-18
Potassium (K)-Dissolved			89.7		%		80-120	23-OCT-18
Sodium (Na)-Dissolved			97.9		%		80-120	23-OCT-18
WG2911717-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
WG2911717-13 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
WG2911717-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R4295018								
WG2911717-5 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
WG2911717-9 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
MET-D-CCMS-VA	**Water**							
Batch R4295717								
WG2911078-3 DUP		**L2183335-4**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	23-OCT-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-OCT-18
Arsenic (As)-Dissolved		0.00149	0.00146		mg/L	2.1	20	23-OCT-18
Barium (Ba)-Dissolved		0.0543	0.0542		mg/L	0.2	20	23-OCT-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-OCT-18
Boron (B)-Dissolved		0.133	0.135		mg/L	1.3	20	23-OCT-18
Cadmium (Cd)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	23-OCT-18
Calcium (Ca)-Dissolved		28.2	28.3		mg/L	0.4	20	23-OCT-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-OCT-18
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-OCT-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-OCT-18
Iron (Fe)-Dissolved		0.330	0.326		mg/L	1.1	20	23-OCT-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-OCT-18
Lithium (Li)-Dissolved		0.0267	0.0271		mg/L	1.3	20	23-OCT-18
Magnesium (Mg)-Dissolved		19.1	19.2		mg/L	0.4	20	23-OCT-18
Manganese (Mn)-Dissolved		0.0855	0.0838		mg/L	2.0	20	23-OCT-18
Molybdenum (Mo)-Dissolved		0.0145	0.0144		mg/L	0.1	20	23-OCT-18
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-OCT-18
Potassium (K)-Dissolved		1.59	1.54		mg/L	3.0	20	23-OCT-18
Selenium (Se)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-OCT-18
Silicon (Si)-Dissolved		4.58	4.64		mg/L	1.2	20	23-OCT-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	23-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4295717								
WG2911078-3 DUP		**L2183335-4**						
Sodium (Na)-Dissolved		46.0	46.2		mg/L	0.2	20	23-OCT-18
Strontium (Sr)-Dissolved		0.392	0.394		mg/L	0.6	20	23-OCT-18
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	23-OCT-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-OCT-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-OCT-18
Uranium (U)-Dissolved		0.00109	0.00108		mg/L	1.7	20	23-OCT-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-OCT-18
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-OCT-18
WG2911078-2 LCS								
Aluminum (Al)-Dissolved			97.9		%		80-120	23-OCT-18
Antimony (Sb)-Dissolved			98.6		%		80-120	23-OCT-18
Arsenic (As)-Dissolved			98.3		%		80-120	23-OCT-18
Barium (Ba)-Dissolved			95.0		%		80-120	23-OCT-18
Bismuth (Bi)-Dissolved			95.3		%		80-120	23-OCT-18
Boron (B)-Dissolved			101.9		%		80-120	23-OCT-18
Cadmium (Cd)-Dissolved			99.0		%		80-120	23-OCT-18
Calcium (Ca)-Dissolved			97.8		%		80-120	23-OCT-18
Chromium (Cr)-Dissolved			98.9		%		80-120	23-OCT-18
Cobalt (Co)-Dissolved			96.3		%		80-120	23-OCT-18
Copper (Cu)-Dissolved			97.5		%		80-120	23-OCT-18
Iron (Fe)-Dissolved			98.1		%		80-120	23-OCT-18
Lead (Pb)-Dissolved			96.5		%		80-120	23-OCT-18
Lithium (Li)-Dissolved			100.2		%		80-120	23-OCT-18
Magnesium (Mg)-Dissolved			106.1		%		80-120	23-OCT-18
Manganese (Mn)-Dissolved			100.6		%		80-120	23-OCT-18
Molybdenum (Mo)-Dissolved			100.7		%		80-120	23-OCT-18
Nickel (Ni)-Dissolved			96.6		%		80-120	23-OCT-18
Potassium (K)-Dissolved			101.5		%		80-120	23-OCT-18
Selenium (Se)-Dissolved			98.2		%		80-120	23-OCT-18
Silicon (Si)-Dissolved			106.3		%		60-140	23-OCT-18
Silver (Ag)-Dissolved			92.3		%		80-120	23-OCT-18
Sodium (Na)-Dissolved			96.0		%		80-120	23-OCT-18
Strontium (Sr)-Dissolved			96.5		%		80-120	23-OCT-18
Thallium (Tl)-Dissolved			95.9		%		80-120	23-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4295717								
WG2911078-2 LCS								
Tin (Sn)-Dissolved			99.2		%		80-120	23-OCT-18
Titanium (Ti)-Dissolved			95.3		%		80-120	23-OCT-18
Uranium (U)-Dissolved			94.0		%		80-120	23-OCT-18
Vanadium (V)-Dissolved			100.2		%		80-120	23-OCT-18
Zinc (Zn)-Dissolved			94.7		%		80-120	23-OCT-18
WG2911078-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	23-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	23-OCT-18
Cadmium (Cd)-Dissolved			<0.000005		mg/L		0.000005	23-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	23-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	23-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	23-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4295717								
WG2911078-1 MB		**NP**						
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	23-OCT-18
Batch R4296513								
WG2912838-3 DUP		**L2183335-2**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	24-OCT-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	24-OCT-18
Arsenic (As)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	24-OCT-18
Barium (Ba)-Dissolved		0.00014	0.00013		mg/L	4.1	20	24-OCT-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	24-OCT-18
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	24-OCT-18
Cadmium (Cd)-Dissolved		<0.0000050	<0.0000050	RPD-NA	mg/L	N/A	20	24-OCT-18
Calcium (Ca)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	24-OCT-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	24-OCT-18
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	24-OCT-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-OCT-18
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	24-OCT-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	24-OCT-18
Lithium (Li)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-OCT-18
Magnesium (Mg)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	24-OCT-18
Manganese (Mn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	24-OCT-18
Molybdenum (Mo)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	24-OCT-18
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-OCT-18
Potassium (K)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	24-OCT-18
Selenium (Se)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	24-OCT-18
Silicon (Si)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	24-OCT-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	24-OCT-18
Sodium (Na)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	24-OCT-18
Strontium (Sr)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	24-OCT-18
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	24-OCT-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	24-OCT-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	24-OCT-18
Uranium (U)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	24-OCT-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-OCT-18
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-OCT-18
WG2912838-2								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4296513								
WG2912838-2 LCS								
Aluminum (Al)-Dissolved			97.6		%		80-120	24-OCT-18
Antimony (Sb)-Dissolved			96.5		%		80-120	24-OCT-18
Arsenic (As)-Dissolved			96.5		%		80-120	24-OCT-18
Barium (Ba)-Dissolved			97.9		%		80-120	24-OCT-18
Bismuth (Bi)-Dissolved			94.1		%		80-120	24-OCT-18
Boron (B)-Dissolved			94.8		%		80-120	24-OCT-18
Cadmium (Cd)-Dissolved			94.0		%		80-120	24-OCT-18
Calcium (Ca)-Dissolved			94.9		%		80-120	24-OCT-18
Chromium (Cr)-Dissolved			96.3		%		80-120	24-OCT-18
Cobalt (Co)-Dissolved			93.4		%		80-120	24-OCT-18
Copper (Cu)-Dissolved			94.2		%		80-120	24-OCT-18
Iron (Fe)-Dissolved			97.0		%		80-120	24-OCT-18
Lead (Pb)-Dissolved			98.4		%		80-120	24-OCT-18
Lithium (Li)-Dissolved			97.5		%		80-120	24-OCT-18
Magnesium (Mg)-Dissolved			99.4		%		80-120	24-OCT-18
Manganese (Mn)-Dissolved			96.1		%		80-120	24-OCT-18
Molybdenum (Mo)-Dissolved			95.6		%		80-120	24-OCT-18
Nickel (Ni)-Dissolved			95.7		%		80-120	24-OCT-18
Potassium (K)-Dissolved			102.0		%		80-120	24-OCT-18
Selenium (Se)-Dissolved			98.3		%		80-120	24-OCT-18
Silicon (Si)-Dissolved			97.0		%		60-140	24-OCT-18
Silver (Ag)-Dissolved			97.1		%		80-120	24-OCT-18
Sodium (Na)-Dissolved			97.1		%		80-120	24-OCT-18
Strontium (Sr)-Dissolved			100.3		%		80-120	24-OCT-18
Thallium (Tl)-Dissolved			96.7		%		80-120	24-OCT-18
Tin (Sn)-Dissolved			96.4		%		80-120	24-OCT-18
Titanium (Ti)-Dissolved			92.0		%		80-120	24-OCT-18
Uranium (U)-Dissolved			101.4		%		80-120	24-OCT-18
Vanadium (V)-Dissolved			97.9		%		80-120	24-OCT-18
Zinc (Zn)-Dissolved			96.2		%		80-120	24-OCT-18
WG2912838-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	24-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4296513								
WG2912838-1 MB		**NP**						
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	24-OCT-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	24-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	24-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	24-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	24-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-OCT-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	24-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	24-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	24-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	24-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	24-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	24-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	24-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	24-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	24-OCT-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	24-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	24-OCT-18
NH3-L-F-CL	**Water**							
Batch R4295198								
WG2911823-17 DUP		**L2183335-8**						
Ammonia as N		0.0762	0.0706		mg/L	7.6	20	23-OCT-18
WG2911823-14 LCS								
Ammonia as N			102.2		%		85-115	23-OCT-18
WG2911823-20 LCS								
Ammonia as N			102.7		%		85-115	23-OCT-18

Quality Control Report

Workorder: L2183335 Report Date: 29-OCT-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-L-F-CL	**Water**							
Batch R4295198								
WG2911823-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	23-OCT-18
WG2911823-19 MB								
Ammonia as N			<0.0050		mg/L		0.005	23-OCT-18
WG2911823-18 MS		**L2183335-8**						
Ammonia as N			108.0		%		75-125	23-OCT-18
NO2-L-IC-N-CL	**Water**							
Batch R4295137								
WG2911876-3 DUP		**L2183335-2**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2911876-2 LCS								
Nitrite (as N)			105.8		%		90-110	20-OCT-18
WG2911876-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	20-OCT-18
WG2911876-4 MS		**L2183335-2**						
Nitrite (as N)			103.9		%		75-125	20-OCT-18
NO3-L-IC-N-CL	**Water**							
Batch R4295137								
WG2911876-3 DUP		**L2183335-2**						
Nitrate (as N)		<0.0050	0.0059	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2911876-2 LCS								
Nitrate (as N)			96.1		%		90-110	20-OCT-18
WG2911876-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	20-OCT-18
WG2911876-4 MS		**L2183335-2**						
Nitrate (as N)			94.6		%		75-125	20-OCT-18
ORP-CL	**Water**							
Batch R4295222								
WG2912008-3 CRM		**CL-ORP**						
ORP			217		mV		210-230	23-OCT-18
WG2912008-7 DUP		**L2183335-3**						
ORP		345	337	J	mV	8.0	15	23-OCT-18
P-T-L-COL-CL	**Water**							
Batch R4293368								
WG2910813-2 LCS								
Phosphorus (P)-Total			104.3		%		80-120	22-OCT-18
WG2910813-6 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-CL	**Water**							
Batch R4293368								
WG2910813-6 LCS								
Phosphorus (P)-Total			106.9		%		80-120	22-OCT-18
WG2910813-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	22-OCT-18
WG2910813-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	22-OCT-18
P-TD-L-COL-CL	**Water**							
Batch R4293368								
WG2910813-2 LCS								
Phosphorus (P)-Total	Dissolved		104.3		%		80-120	22-OCT-18
WG2910813-6 LCS								
Phosphorus (P)-Total	Dissolved		106.9		%		80-120	22-OCT-18
WG2910813-1 MB								
Phosphorus (P)-Total	Dissolved		<0.0020		mg/L		0.002	22-OCT-18
WG2910813-5 MB								
Phosphorus (P)-Total	Dissolved		<0.0020		mg/L		0.002	22-OCT-18
PH-CL	**Water**							
Batch R4292115								
WG2910202-11 LCS								
pH			7.02		pH		6.9-7.1	21-OCT-18
Batch R4299672								
WG2914398-2 LCS								
pH			6.98		pH		6.9-7.1	25-OCT-18
PO4-DO-L-COL-CL	**Water**							
Batch R4289032								
WG2908839-3 DUP		**L2183335-1**						
Orthophosphate-Dissolved (as P)		0.0084	0.0083		mg/L	0.9	20	19-OCT-18
WG2908839-2 LCS								
Orthophosphate-Dissolved (as P)			105.3		%		80-120	19-OCT-18
WG2908839-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	19-OCT-18
WG2908839-4 MS		**L2183335-1**						
Orthophosphate-Dissolved (as P)			99.6		%		70-130	19-OCT-18
SO4-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-CL	**Water**							
Batch R4295137								
WG2911876-3 DUP		**L2183335-2**						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	20-OCT-18
WG2911876-2 LCS								
Sulfate (SO4)			102.4		%		90-110	20-OCT-18
WG2911876-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	20-OCT-18
WG2911876-4 MS		**L2183335-2**						
Sulfate (SO4)			100.3		%		75-125	20-OCT-18
SOLIDS-TDS-CL	**Water**							
Batch R4296702								
WG2911487-8 LCS								
Total Dissolved Solids			101.0		%		85-115	23-OCT-18
WG2911487-7 MB								
Total Dissolved Solids			<10		mg/L		10	23-OCT-18
TEH-BC-VA-CL	**Water**							
Batch R4294872								
WG2911600-2 LCS								
EPH10-19			116.0		%		50-150	21-OCT-18
EPH19-32			122.5		%		50-150	21-OCT-18
WG2911600-4 LCS								
EPH10-19			102.2		%		50-150	23-OCT-18
EPH19-32			107.1		%		50-150	23-OCT-18
WG2911600-1 MB								
EPH10-19			<0.25		mg/L		0.25	21-OCT-18
EPH19-32			<0.25		mg/L		0.25	21-OCT-18
WG2911600-3 MB								
EPH10-19			<0.25		mg/L		0.25	23-OCT-18
EPH19-32			<0.25		mg/L		0.25	23-OCT-18
TEH-WATER-VA-CL	**Water**							
Batch R4294872								
WG2911600-2 LCS								
TEH (C10-C30)			117.1		%		50-150	21-OCT-18
WG2911600-4 LCS								
TEH (C10-C30)			103.2		%		50-150	23-OCT-18
WG2911600-1 MB								
TEH (C10-C30)			<0.25		mg/L		0.25	21-OCT-18
WG2911600-3 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TEH-WATER-VA-CL	**Water**							
Batch R4294872								
WG2911600-3 MB								
TEH (C10-C30)			<0.25		mg/L		0.25	23-OCT-18
TKN-L-F-CL	**Water**							
Batch R4291748								
WG2908924-2 LCS								
Total Kjeldahl Nitrogen			107.9		%		75-125	22-OCT-18
WG2908924-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	22-OCT-18
TSS-L-CL	**Water**							
Batch R4296280								
WG2911332-28 LCS								
Total Suspended Solids			94.3		%		85-115	23-OCT-18
WG2911332-27 MB								
Total Suspended Solids			<1.0		mg/L		1	23-OCT-18
TURBIDITY-CL	**Water**							
Batch R4289537								
WG2908994-6 DUP		**L2183335-8**						
Turbidity		103	102		NTU	1.0	15	19-OCT-18
WG2908994-2 LCS								
Turbidity			97.5		%		85-115	19-OCT-18
WG2908994-5 LCS								
Turbidity			97.0		%		85-115	19-OCT-18
WG2908994-1 MB								
Turbidity			<0.10		NTU		0.1	19-OCT-18
WG2908994-4 MB								
Turbidity			<0.10		NTU		0.1	19-OCT-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	17-OCT-18 14:10	23-OCT-18 11:00	0.25	141	hours	EHTR-FM
	2	17-OCT-18 14:15	23-OCT-18 11:00	0.25	141	hours	EHTR-FM
	3	17-OCT-18 14:20	23-OCT-18 11:00	0.25	141	hours	EHTR-FM
	4	17-OCT-18 14:05	23-OCT-18 11:00	0.25	141	hours	EHTR-FM
	6	17-OCT-18 11:50	23-OCT-18 11:00	0.25	143	hours	EHTR-FM
	8	17-OCT-18 12:35	23-OCT-18 11:00	0.25	142	hours	EHTR-FM
pH							
	1	17-OCT-18 14:10	21-OCT-18 00:00	0.25	82	hours	EHTR-FM
	2	17-OCT-18 14:15	25-OCT-18 10:00	0.25	188	hours	EHTR-FM
	3	17-OCT-18 14:20	25-OCT-18 10:00	0.25	188	hours	EHTR-FM
	4	17-OCT-18 14:05	25-OCT-18 10:00	0.25	188	hours	EHTR-FM
	6	17-OCT-18 11:50	25-OCT-18 10:00	0.25	190	hours	EHTR-FM
	8	17-OCT-18 12:35	25-OCT-18 10:00	0.25	189	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	3	17-OCT-18 14:20	26-OCT-18 08:52	3	9	days	EHT
Nitrite in Water by IC (Low Level)							
	3	17-OCT-18 14:20	26-OCT-18 08:52	3	9	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2183335 were received on 18-OCT-18 09:15.

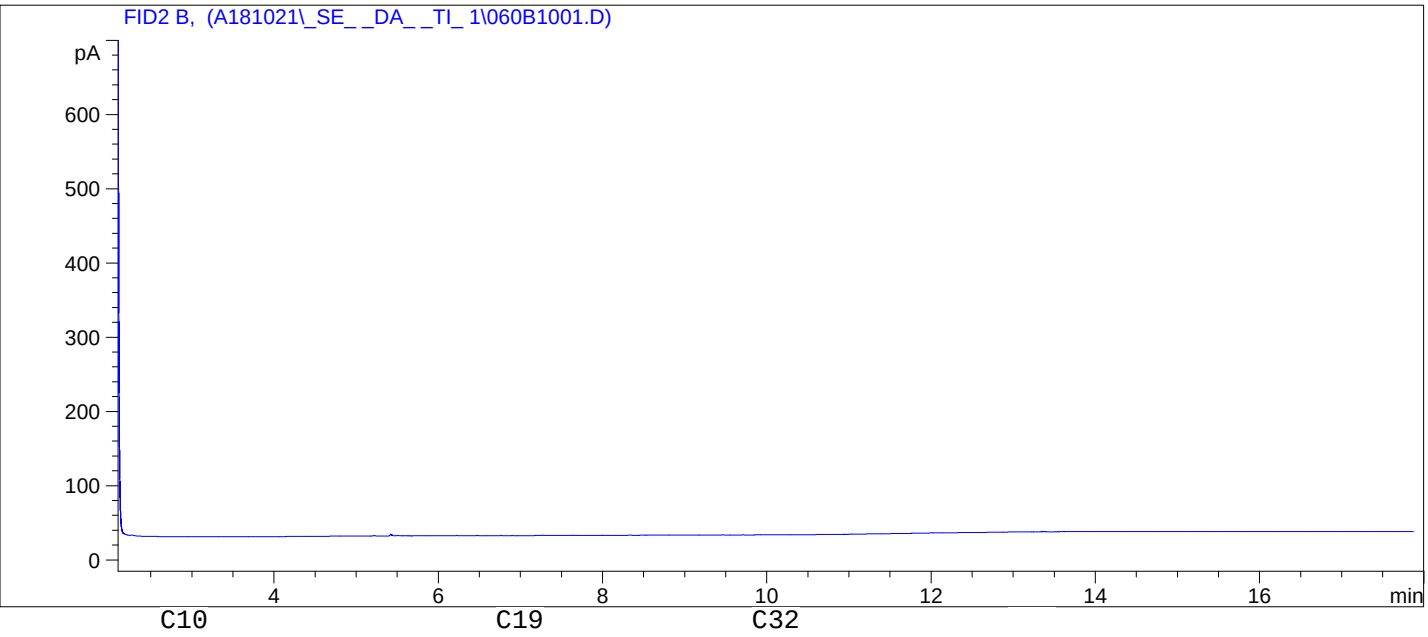
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

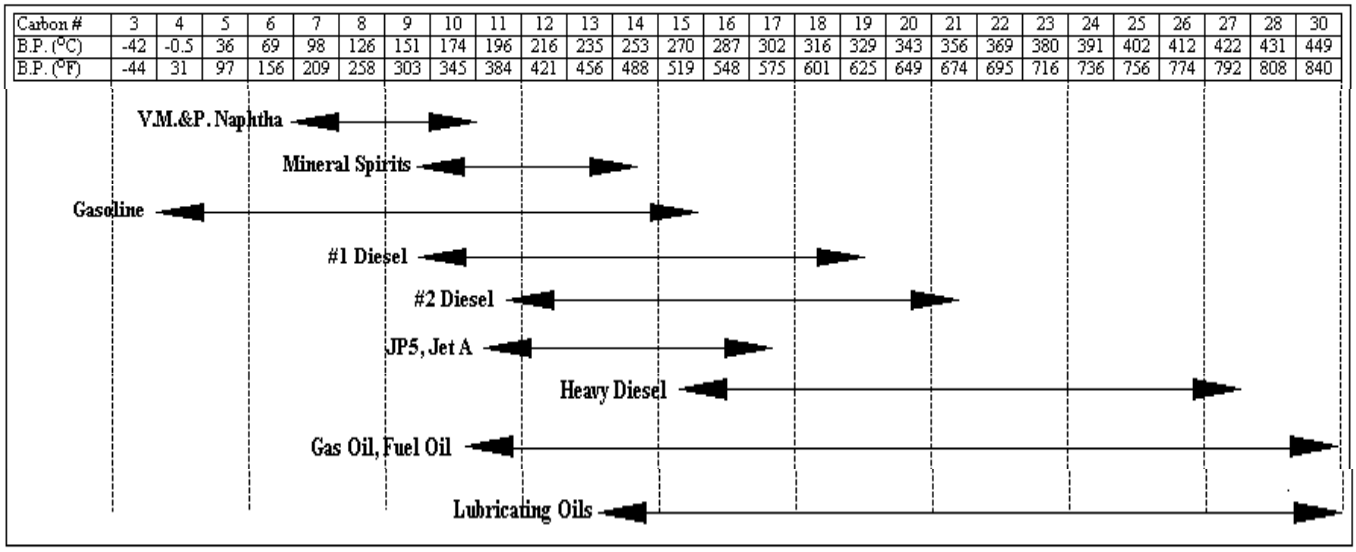
Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Client ID: EV_MC5G _WG_2018-10_NP

Sample ID: L2183335-1 V4BC
Injection Date: 10/21/2018
Injection Time: 9:26:44 PM
Instrument ID: HP9
Operator:



Boiling Point Distribution Range for Petroleum Based Fuel Products



Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Summed Peaks Report

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Final Summed Peaks Report

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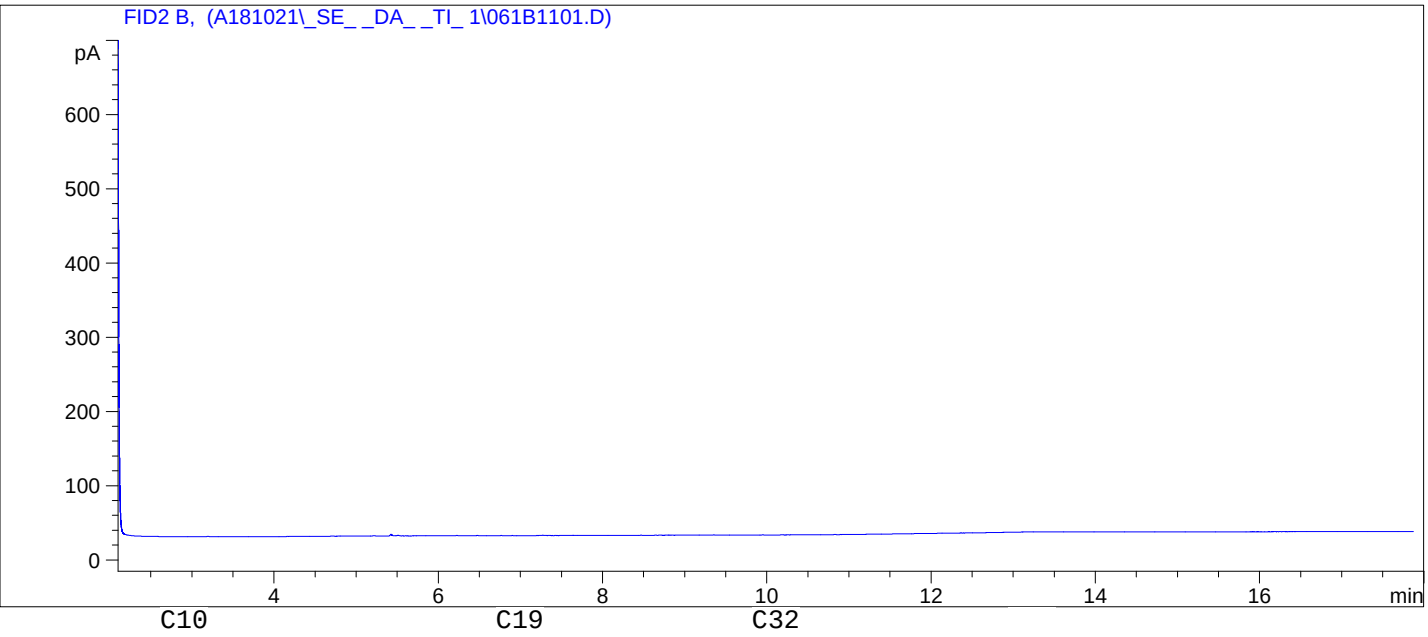
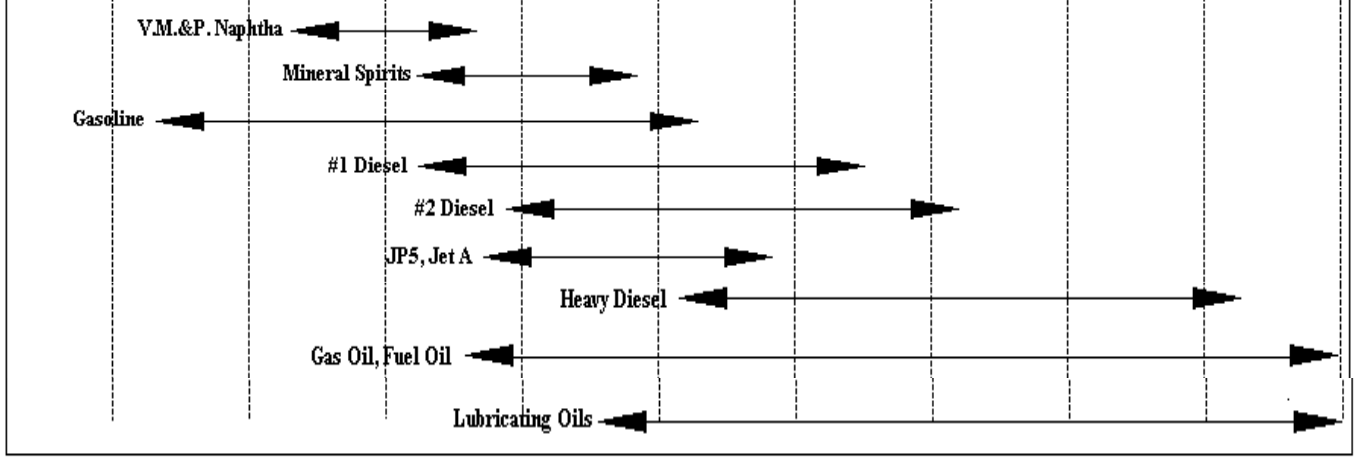
Client ID: EV_MC6 W_WG_2018-10_NP

Sample ID: L2183335-2 V4BC
Injection Date: 10/21/2018
Injection Time: 9:58:46 PM
Instrument ID: HP9
Operator:



Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Summed Peaks Report

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Final Summed Peaks Report

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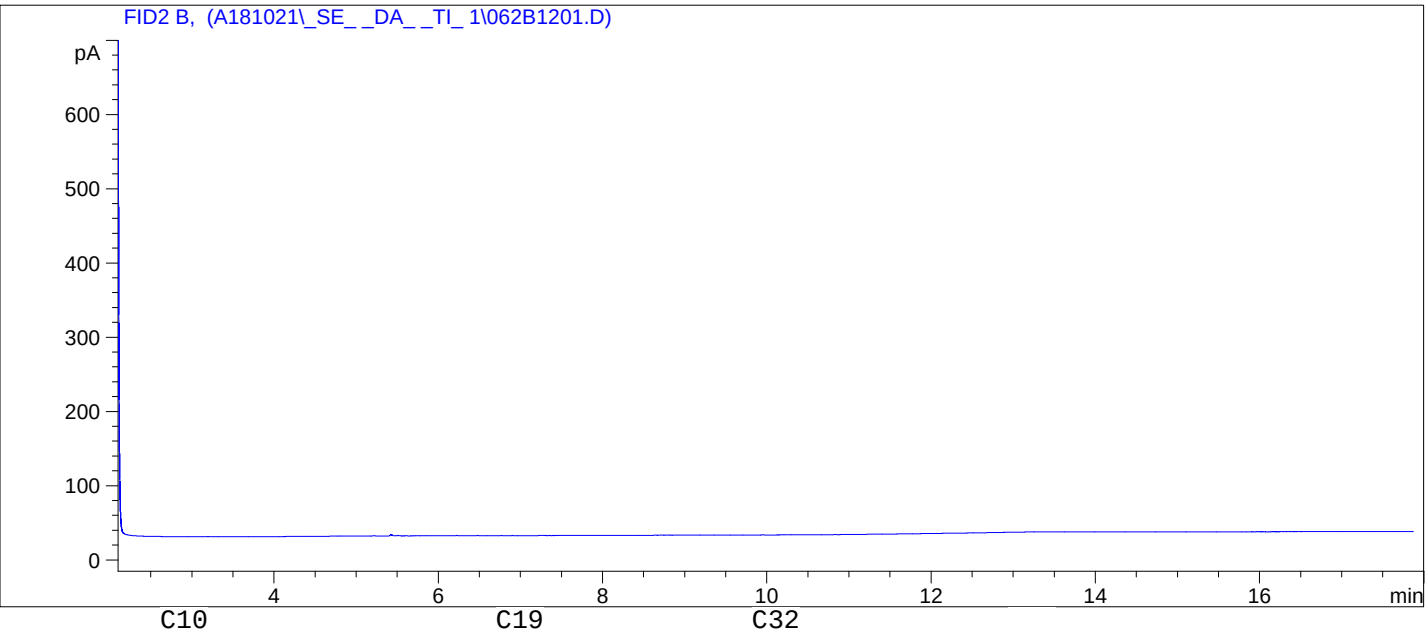
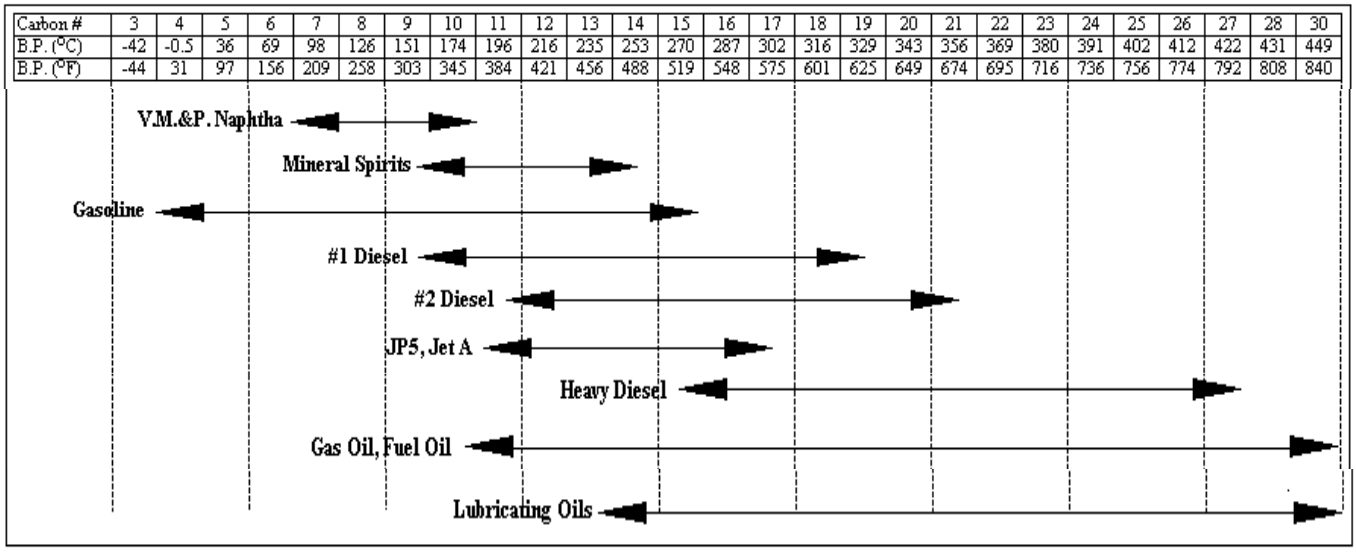
Client ID: EV_MC7 W_WG_2018-10_NP

Sample ID: L2183335-3 V4BC
Injection Date: 10/21/2018
Injection Time: 10:30:32 PM
Instrument ID: HP9
Operator:



Boiling Point Distribution Range for Petroleum Based Fuel Products



Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Summed Peaks Report

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Final Summed Peaks Report

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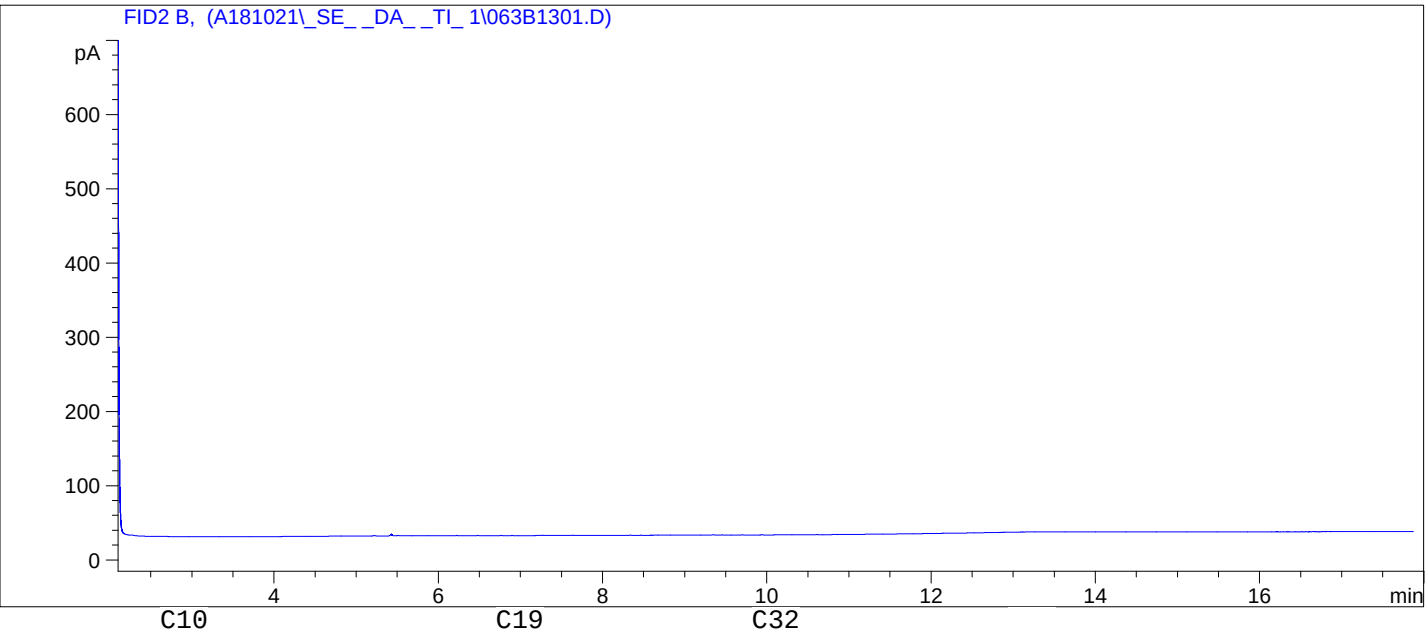
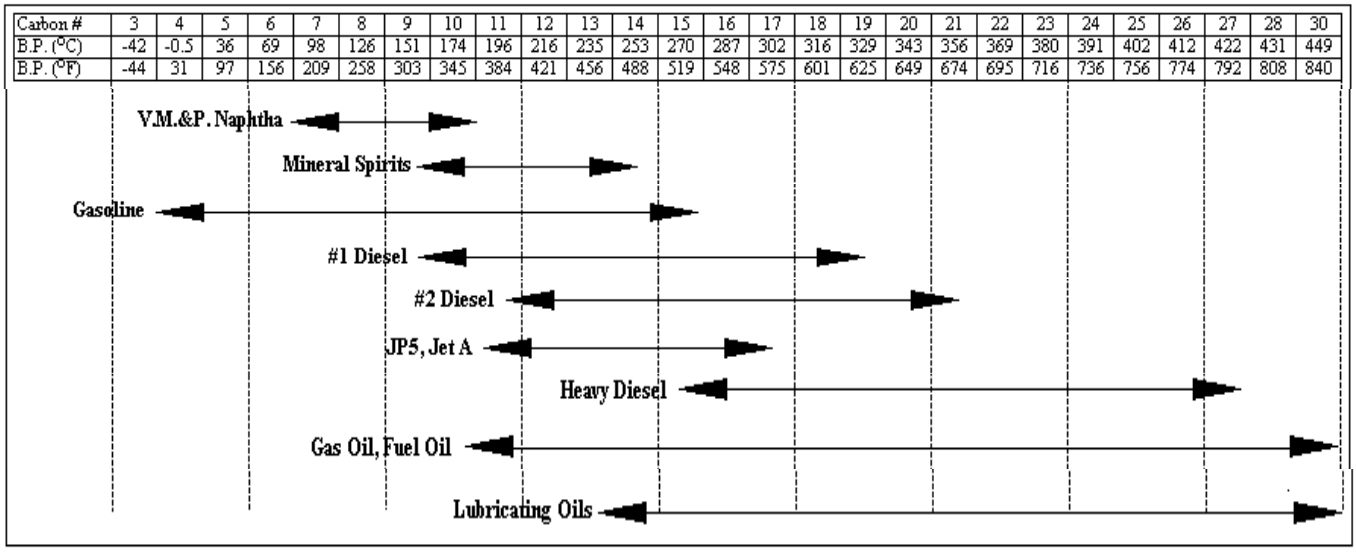
Client ID: EV_OCG _WG_2018-10_NP

Sample ID: L2183335-4 V4BC
Injection Date: 10/21/2018
Injection Time: 11:02:30 PM
Instrument ID: HP9
Operator:



Boiling Point Distribution Range for Petroleum Based Fuel Products



Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Summed Peaks Report

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Final Summed Peaks Report

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Teck

COC ID:	20181017GW
TURNAROU[ND]	

L2183335-COFC

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations
Job Description	Q4 Ground Water Sampling
Project Manager	Cameron Griffin
Email	Cameron.Griffin@Teck.com
Address	RR#1 HWY# 3
City	Sparwood
Province	BC
Postal Code	V1C 4C3
Country	Canada
Phone Number	1-250-865-5289

Lab Name	AL
Lab Contact	Ly
Email	Ly
Address	25
City	Calgary
Province	AB
Postal Code	T1Y 7B5
Country	Canada
Phone Number	1 403 291 9897

	Excel	PDF	EDD
...com	X	X	X
...ne.com			X
...com	X	X	X
...eck.com	X	X	X
Email 5: Teck.Lab.Results@sharepoint.teck.com	X	X	X

PO # 538700

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorus	TKN/TOC (APHA 4500-NORG)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	Total Nitrogen for BC (NO2 and NO3)	EPH (C10-C32)	T-Mercury	D-Mercury
	FILTERED								No	No	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes
	PRESERVED										Nitric	Sulphuric	Sulphuric	Sulphuric				Sodium Bisulphate	HCl	HCl
1	EV_MC5gw_WG_2018-10_NP	EV_MC5gw	WG	N	10/17/2018	14:10	G	7	1		1	1		1		1	1	2		
2	EV_MC6gw_WG_2018-10_NP	EV_MC6gw	WG	N	10/17/2018	14:15	G	7	1		1	1		1		1	1	2		
3	EV_MC7gw_WG_2018-10_NP	EV_MC7gw	WG	N	10/17/2018	14:20	G	5	1					1	1		1	2		
4	EV_OCgw_WG_2018-10_NP	EV_OCgw	WG	N	10/17/2018	14:05	G	7	1		1	1		1		1	1	2		
5	EV_OCgw_WG_2018-10_FB-HG	EV_OCgw	WG	N	10/17/2018	14:05	G	1								1				
6	EV_MCgwS_WG_2018-10_NP	EV_MCgwS	WG	N	10/17/2018	11:50	G	5	1		1	1		1		1	1			
7	EV_MCgwS_WG_2018-10_FB-HG	EV_MCgwS	WG	N	10/17/2018	11:50	G	1								1				
8	EV_MCgwD_WG_2018-10_NP	EV_MCgwD	WG	N	10/17/2018	12:35	G	5	1		1	1		1		1	1			
9	EV_MCgwD_WG_2018-10_FB-HG	EV_MCgwD	WG	N	10/17/2018	12:35	G	1								1				
						Total		39												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Ultra-trace Mercury samples are unpreserved	Kimberley Hackett	October 17, 2018	[signature]	10/18 9:15

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Kimberley Hackett	Mobile #	
Sampler's Signature	[signature]	Date/Time	October 17, 2018

5

Teck Coal Ltd. (Elkview)
ATTN: Cameron Griffin
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3

Date Received: 25-OCT-18
Report Date: 01-NOV-18 17:51 (MT)
Version: FINAL

Client Phone: 250-425-8746

Certificate of Analysis

Lab Work Order #: L2187165

Project P.O. #: VPO00538700
Job Reference: ELKVIEW OPERATIONS
C of C Numbers: 20181024GW
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2187165-1	L2187165-2	L2187165-3		
	Description	WG	WG	WG		
	Sampled Date	24-OCT-18	24-OCT-18	24-OCT-18		
	Sampled Time	10:05	08:30	13:30		
	Client ID	EV_BCGW_WG_2018-10-24_NP	EV_ECGW_WG_2018-10_NP	EV_WF_SW_WG_2018-10_NP		
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0	<5.0		
	Conductivity (@ 25C) (uS/cm)	832	404	506		
	Hardness (as CaCO3) (mg/L)	493	178	211		
	pH (pH)	7.89	8.40	7.81		
	ORP (mV)	330	267	274		
	Total Suspended Solids (mg/L)	3.4	100	25.4		
	Total Dissolved Solids (mg/L)	608 DLHC	245 DLHC	355 DLHC		
	Turbidity (NTU)	2.64	68.3	24.2		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	5.8	1.4	1.1		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	217	222	89.2		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	8.4	<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	217	230	89.2		
	Ammonia as N (mg/L)	0.0131	0.126	0.141		
	Bromide (Br) (mg/L)	0.146	<0.050	0.111		
	Chloride (Cl) (mg/L)	7.04	0.56	3.08		
	Fluoride (F) (mg/L)	0.136	0.910	0.071		
	Ion Balance (%)	99.5	93.8	75.4 RRV		
	Nitrate (as N) (mg/L)	4.98	0.127	0.0069		
	Nitrite (as N) (mg/L)	<0.0010	0.0091	<0.0010		
	Total Kjeldahl Nitrogen (mg/L)	0.275 TKNI	0.279	0.223		
	Total Nitrogen (mg/L)	5.26	0.415	0.229		
	Orthophosphate-Dissolved (as P) (mg/L)	0.0021	0.0218	<0.0010		
	Phosphorus (P)-Total Dissolved (mg/L)	0.0022	0.0192	0.0045		
	Phosphorus (P)-Total (mg/L)	0.0071	0.108	0.0127		
	Sulfate (SO4) (mg/L)	253	25.0	196		
	Anion Sum (meq/L)	10.2	5.20	5.96		
	Cation Sum (meq/L)	10.1	4.87	4.50		
	Cation - Anion Balance (%)	-0.2	-3.2	-14.0		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.40	1.95	1.94		
	Total Organic Carbon (mg/L)	1.34	4.9 DLM	1.70		
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030		
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Arsenic (As)-Dissolved (mg/L)	0.00011	0.00041	0.00011		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2187165-1	L2187165-2	L2187165-3		
	Description	WG	WG	WG		
	Sampled Date	24-OCT-18	24-OCT-18	24-OCT-18		
	Sampled Time	10:05	08:30	13:30		
	Client ID	EV_BCGW_WG_2018-10-24_NP	EV_ECGW_WG_2018-10_NP	EV_WF_SW_WG_2018-10_NP		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Barium (Ba)-Dissolved (mg/L)	0.0399	0.0594	0.00770		
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
	Boron (B)-Dissolved (mg/L)	0.018	0.124	<0.010		
	Cadmium (Cd)-Dissolved (ug/L)	0.0448	0.0326	<0.0050		
	Calcium (Ca)-Dissolved (mg/L)	116	38.5	17.7		
	Chromium (Cr)-Dissolved (mg/L)	0.00016	<0.00010	<0.00010		
	Cobalt (Co)-Dissolved (ug/L)	<0.10	0.31	<0.10		
	Copper (Cu)-Dissolved (mg/L)	0.00056	0.00122	<0.00050		
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	0.028		
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
	Lithium (Li)-Dissolved (mg/L)	0.0299	0.0118	0.0106		
	Magnesium (Mg)-Dissolved (mg/L)	49.1	19.9	40.4		
	Manganese (Mn)-Dissolved (mg/L)	0.00025	0.187	0.277		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.000839	0.0142	0.000443		
	Nickel (Ni)-Dissolved (mg/L)	0.00110	0.00202	<0.00050		
	Potassium (K)-Dissolved (mg/L)	1.32	1.15	2.60		
	Selenium (Se)-Dissolved (ug/L)	29.8	0.069	<0.050		
	Silicon (Si)-Dissolved (mg/L)	2.81	4.97	<0.050		
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	5.39	29.4	4.58		
	Strontium (Sr)-Dissolved (mg/L)	0.194	0.409	0.0139		
	Thallium (Tl)-Dissolved (mg/L)	0.000014	0.000028	<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	0.00012		
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	0.00153	0.00122	<0.000010		
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	0.0027	0.0028	<0.0010		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2187165-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2187165-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2187165-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2187165-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2187165-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Reference Information

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N-T-CALC-CL Water Total Nitrogen (Calculation) APHA 4500 N-Calculated

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

P-TD-L-COL-CL Water Phosphorus (P)-Total Dissolved APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

20181024GW

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd. (Elkview)
RR#1 HIGHWAY #3
SPARWOOD BC V1C 4C3
Contact: Cameron Griffin

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4305195								
WG2917151-2 LCS								
Acidity (as CaCO3)			107.3		%		85-115	29-OCT-18
WG2917151-1 MB								
Acidity (as CaCO3)			1.9		mg/L		2	29-OCT-18
ALK-MAN-CL	**Water**							
Batch R4307696								
WG2917325-11 LCS								
Alkalinity, Total (as CaCO3)			103.8		%		85-115	29-OCT-18
WG2917325-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	29-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4304972								
WG2916278-3 DUP		**L2187165-2**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	28-OCT-18
WG2916278-2 LCS								
Beryllium (Be)-Dissolved			97.3		%		80-120	28-OCT-18
WG2916278-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	28-OCT-18
WG2916278-4 MS		**L2187165-1**						
Beryllium (Be)-Dissolved			94.4		%		70-130	28-OCT-18
BR-L-IC-N-CL	**Water**							
Batch R4303937								
WG2916935-6 LCS								
Bromide (Br)			104.7		%		85-115	26-OCT-18
WG2916935-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	26-OCT-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4309976								
WG2920290-2 LCS								
Dissolved Organic Carbon			98.1		%		80-120	31-OCT-18
WG2920290-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	31-OCT-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4309976								
WG2920290-2 LCS								
Total Organic Carbon			102.2		%		80-120	31-OCT-18
WG2920290-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4309976								
WG2920290-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	31-OCT-18
CL-IC-N-CL	**Water**							
Batch R4303937								
WG2916935-6 LCS								
Chloride (Cl)			101.7		%		90-110	26-OCT-18
WG2916935-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-OCT-18
COLOUR-TRUE-CL	**Water**							
Batch R4301632								
WG2915666-2 LCS								
Colour, True			98.5		%		85-115	26-OCT-18
WG2915666-1 MB								
Colour, True			<5.0		CU		5	26-OCT-18
EC-L-PCT-CL	**Water**							
Batch R4307696								
WG2917325-11 LCS								
Conductivity (@ 25C)			95.6		%		90-110	29-OCT-18
WG2917325-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	29-OCT-18
F-IC-N-CL	**Water**							
Batch R4303937								
WG2916935-6 LCS								
Fluoride (F)			103.6		%		90-110	26-OCT-18
WG2916935-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-OCT-18
HG-D-CVAA-VA	**Water**							
Batch R4305895								
WG2916150-2 LCS								
Mercury (Hg)-Dissolved			97.8		%		80-120	30-OCT-18
WG2916150-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	30-OCT-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4304972								
WG2916278-3 DUP		**L2187165-2**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	28-OCT-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-OCT-18
Arsenic (As)-Dissolved		0.00041	0.00038		mg/L	9.1	20	28-OCT-18
Barium (Ba)-Dissolved		0.0594	0.0566		mg/L	4.7	20	28-OCT-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-OCT-18
Boron (B)-Dissolved		0.124	0.124		mg/L	0.1	20	28-OCT-18
Cadmium (Cd)-Dissolved		0.0000326	0.0000320		mg/L	1.7	20	28-OCT-18
Calcium (Ca)-Dissolved		38.5	38.7		mg/L	0.6	20	28-OCT-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-OCT-18
Cobalt (Co)-Dissolved		0.00031	0.00030		mg/L	2.4	20	28-OCT-18
Copper (Cu)-Dissolved		0.00122	0.00121		mg/L	0.4	20	28-OCT-18
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-OCT-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-OCT-18
Lithium (Li)-Dissolved		0.0118	0.0115		mg/L	2.6	20	28-OCT-18
Magnesium (Mg)-Dissolved		19.9	18.6		mg/L	6.9	20	28-OCT-18
Manganese (Mn)-Dissolved		0.187	0.182		mg/L	2.8	20	28-OCT-18
Molybdenum (Mo)-Dissolved		0.0142	0.0137		mg/L	3.8	20	28-OCT-18
Nickel (Ni)-Dissolved		0.00202	0.00197		mg/L	2.7	20	28-OCT-18
Potassium (K)-Dissolved		1.15	1.13		mg/L	2.1	20	28-OCT-18
Selenium (Se)-Dissolved		0.000069	0.000066		mg/L	4.1	20	28-OCT-18
Silicon (Si)-Dissolved		4.97	4.97		mg/L	0.1	20	28-OCT-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-OCT-18
Sodium (Na)-Dissolved		29.4	28.8		mg/L	2.2	20	28-OCT-18
Strontium (Sr)-Dissolved		0.409	0.398		mg/L	2.7	20	28-OCT-18
Thallium (Tl)-Dissolved		0.000028	0.000028		mg/L	0.2	20	28-OCT-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-OCT-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-OCT-18
Uranium (U)-Dissolved		0.00122	0.00122		mg/L	0.0	20	28-OCT-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-OCT-18
Zinc (Zn)-Dissolved		0.0028	0.0028		mg/L	0.3	20	28-OCT-18
WG2916278-2 LCS								
Aluminum (Al)-Dissolved			103.6		%		80-120	28-OCT-18
Antimony (Sb)-Dissolved			92.4		%		80-120	28-OCT-18
Arsenic (As)-Dissolved			98.7		%		80-120	28-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4304972								
WG2916278-2 LCS								
Barium (Ba)-Dissolved			100.7		%		80-120	28-OCT-18
Bismuth (Bi)-Dissolved			97.7		%		80-120	28-OCT-18
Boron (B)-Dissolved			97.4		%		80-120	28-OCT-18
Cadmium (Cd)-Dissolved			103.5		%		80-120	28-OCT-18
Calcium (Ca)-Dissolved			93.5		%		80-120	28-OCT-18
Chromium (Cr)-Dissolved			100.5		%		80-120	28-OCT-18
Cobalt (Co)-Dissolved			101.3		%		80-120	28-OCT-18
Copper (Cu)-Dissolved			98.6		%		80-120	28-OCT-18
Iron (Fe)-Dissolved			88.8		%		80-120	28-OCT-18
Lead (Pb)-Dissolved			97.6		%		80-120	28-OCT-18
Lithium (Li)-Dissolved			98.6		%		80-120	28-OCT-18
Magnesium (Mg)-Dissolved			102.6		%		80-120	28-OCT-18
Manganese (Mn)-Dissolved			101.2		%		80-120	28-OCT-18
Molybdenum (Mo)-Dissolved			95.3		%		80-120	28-OCT-18
Nickel (Ni)-Dissolved			101.1		%		80-120	28-OCT-18
Potassium (K)-Dissolved			100.6		%		80-120	28-OCT-18
Selenium (Se)-Dissolved			91.9		%		80-120	28-OCT-18
Silicon (Si)-Dissolved			100.5		%		60-140	28-OCT-18
Silver (Ag)-Dissolved			88.8		%		80-120	28-OCT-18
Sodium (Na)-Dissolved			108.4		%		80-120	28-OCT-18
Strontium (Sr)-Dissolved			88.7		%		80-120	28-OCT-18
Thallium (Tl)-Dissolved			96.2		%		80-120	28-OCT-18
Tin (Sn)-Dissolved			92.4		%		80-120	28-OCT-18
Titanium (Ti)-Dissolved			98.3		%		80-120	28-OCT-18
Uranium (U)-Dissolved			98.3		%		80-120	28-OCT-18
Vanadium (V)-Dissolved			102.6		%		80-120	28-OCT-18
Zinc (Zn)-Dissolved			96.7		%		80-120	28-OCT-18
WG2916278-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	28-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	28-OCT-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	28-OCT-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	28-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	28-OCT-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	28-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4304972								
WG2916278-1 MB		**NP**						
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	28-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	28-OCT-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	28-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	28-OCT-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	28-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	28-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	28-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	28-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	28-OCT-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	28-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	28-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	28-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	28-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	28-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	28-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	28-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	28-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	28-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	28-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	28-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	28-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	28-OCT-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	28-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	28-OCT-18
WG2916278-4 MS		**L2187165-1**						
Aluminum (Al)-Dissolved			98.8		%		70-130	28-OCT-18
Antimony (Sb)-Dissolved			93.5		%		70-130	28-OCT-18
Arsenic (As)-Dissolved			104.4		%		70-130	28-OCT-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	28-OCT-18
Bismuth (Bi)-Dissolved			83.5		%		70-130	28-OCT-18
Boron (B)-Dissolved			98.4		%		70-130	28-OCT-18
Cadmium (Cd)-Dissolved			102.3		%		70-130	28-OCT-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	28-OCT-18
Chromium (Cr)-Dissolved			100.4		%		70-130	28-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4304972								
WG2916278-4 MS		**L2187165-1**						
Cobalt (Co)-Dissolved			97.2		%		70-130	28-OCT-18
Copper (Cu)-Dissolved			98.1		%		70-130	28-OCT-18
Iron (Fe)-Dissolved			94.5		%		70-130	28-OCT-18
Lead (Pb)-Dissolved			89.0		%		70-130	28-OCT-18
Lithium (Li)-Dissolved			91.4		%		70-130	28-OCT-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	28-OCT-18
Manganese (Mn)-Dissolved			100.9		%		70-130	28-OCT-18
Molybdenum (Mo)-Dissolved			92.9		%		70-130	28-OCT-18
Nickel (Ni)-Dissolved			98.3		%		70-130	28-OCT-18
Potassium (K)-Dissolved			99.5		%		70-130	28-OCT-18
Selenium (Se)-Dissolved			104.1		%		70-130	28-OCT-18
Silicon (Si)-Dissolved			92.0		%		70-130	28-OCT-18
Silver (Ag)-Dissolved			88.5		%		70-130	28-OCT-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	28-OCT-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	28-OCT-18
Thallium (Tl)-Dissolved			85.5		%		70-130	28-OCT-18
Tin (Sn)-Dissolved			91.2		%		70-130	28-OCT-18
Titanium (Ti)-Dissolved			99.9		%		70-130	28-OCT-18
Uranium (U)-Dissolved			96.4		%		70-130	28-OCT-18
Vanadium (V)-Dissolved			103.1		%		70-130	28-OCT-18
Zinc (Zn)-Dissolved			92.8		%		70-130	28-OCT-18
NH3-L-F-CL	**Water**							
Batch R4308890								
WG2919658-6 LCS								
Ammonia as N			104.5		%		85-115	31-OCT-18
WG2919658-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	31-OCT-18
NO2-L-IC-N-CL	**Water**							
Batch R4303937								
WG2916935-6 LCS								
Nitrite (as N)			104.8		%		90-110	26-OCT-18
WG2916935-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-OCT-18
NO3-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4303937								
WG2916935-6 LCS								
Nitrate (as N)			101.9		%		90-110	26-OCT-18
WG2916935-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-OCT-18
ORP-CL	**Water**							
Batch R4310607								
WG2917386-3 CRM		**CL-ORP**						
ORP			212		mV		210-230	29-OCT-18
WG2917386-5 CRM		**CL-ORP**						
ORP			221		mV		210-230	29-OCT-18
P-T-L-COL-CL	**Water**							
Batch R4304773								
WG2916386-6 LCS								
Phosphorus (P)-Total			109.5		%		80-120	28-OCT-18
WG2916386-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	28-OCT-18
P-TD-L-COL-CL	**Water**							
Batch R4304773								
WG2916386-6 LCS								
Phosphorus (P)-Total	Dissolved		109.5		%		80-120	28-OCT-18
WG2916386-5 MB								
Phosphorus (P)-Total	Dissolved		<0.0020		mg/L		0.002	28-OCT-18
PH-CL	**Water**							
Batch R4307696								
WG2917325-11 LCS								
pH			7.00		pH		6.9-7.1	29-OCT-18
PO4-DO-L-COL-CL	**Water**							
Batch R4299752								
WG2914416-14 LCS								
Orthophosphate-Dissolved (as P)			105.9		%		80-120	25-OCT-18
WG2914416-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	25-OCT-18
SO4-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-CL	**Water**							
Batch R4303937								
WG2916935-6 LCS								
Sulfate (SO4)			102.6		%		90-110	26-OCT-18
WG2916935-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	26-OCT-18
SOLIDS-TDS-CL	**Water**							
Batch R4308876								
WG2917752-2 LCS								
Total Dissolved Solids			96.8		%		85-115	30-OCT-18
WG2917752-5 LCS								
Total Dissolved Solids			96.5		%		85-115	30-OCT-18
WG2917752-1 MB								
Total Dissolved Solids			<10		mg/L		10	30-OCT-18
WG2917752-4 MB								
Total Dissolved Solids			<10		mg/L		10	30-OCT-18
TKN-L-F-CL	**Water**							
Batch R4305487								
WG2916153-2 LCS								
Total Kjeldahl Nitrogen			94.2		%		75-125	29-OCT-18
WG2916153-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	29-OCT-18
TSS-L-CL	**Water**							
Batch R4308604								
WG2918144-4 LCS								
Total Suspended Solids			92.5		%		85-115	30-OCT-18
WG2918144-6 LCS								
Total Suspended Solids			92.3		%		85-115	30-OCT-18
WG2918144-3 MB								
Total Suspended Solids			<1.0		mg/L		1	30-OCT-18
WG2918144-5 MB								
Total Suspended Solids			<1.0		mg/L		1	30-OCT-18
TURBIDITY-CL	**Water**							
Batch R4301587								
WG2915468-2 LCS								
Turbidity			95.0		%		85-115	26-OCT-18
WG2915468-1 MB								
Turbidity			<0.10		NTU		0.1	26-OCT-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	24-OCT-18 10:05	29-OCT-18 12:30	0.25	122	hours	EHTR-FM
	2	24-OCT-18 08:30	29-OCT-18 12:30	0.25	124	hours	EHTR-FM
	3	24-OCT-18 13:30	29-OCT-18 12:30	0.25	119	hours	EHTR-FM
pH							
	1	24-OCT-18 10:05	29-OCT-18 13:00	0.25	123	hours	EHTR-FM
	2	24-OCT-18 08:30	29-OCT-18 13:00	0.25	125	hours	EHTR-FM
	3	24-OCT-18 13:30	01-NOV-18 13:00	0.25	192	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2187165 were received on 25-OCT-18 09:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2187165-COFC

COC ID:	20181024GW	TURNAROUND					Excel	PDF	EDD
PROJECT/CLIENT INFO									
Facility Name / Job#	Elkview Operations	Lab Name	ALS C						
Job Description	Q4 Ground Water Sampling	Lab Contact	Lyudm						
Project Manager	Cameron Griffin	Email	Lyudy						
Email	Cameron.Griffin@Teck.com	Address	2559 2						
Address	RR#1 HWY#3					Email 4:	Cameron.Griffin@teck.com		
						Email 5:	Teck.Lab.Results@sharepoint.teck.com		
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO #	538700
Postal Code	V1C 4C3	Country	Canada	Postal Code	T1Y 7B5	Country	Canada		
Phone Number	1-250-865-5289			Phone Number	1 403 291 9897				

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F, Field; L - Lab, FL - Field & Lab, N - None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTERED (FIELD)	No	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes
								PRESERVED			Nitric	Sulphuric	Sulphuric	Sulphuric					Sodium Bisulphate	HCl	HCl
								ANALYSIS	TECKCOAL-ROUTINE-VA (E305.1)	True Colour	TECKCOAL-MET-D-VA (SW6020)	DOC (APHA 5310)	Dissolved Phosphorus	TKN/TOC (APHA 4500-NO3-G)	T-ULTRA MERCURY (SW6020)	D-ULTRA MERCURY (SW6020)	Total Nitrogen for BC (NO2 and NO3)	EPH (C10-C12)	T-Metals	D-Mercury
EV_BCgw_WG_2018-10-24_NP	EV_BCgw	WG	N	10/24/2018	10:05	G	5		1		1	1		1			1			1
EV_ECgw_WG_2018-10_NP	EV_ECgw	WG	N	10/24/2018	8:30	G	5		1		1	1		1			1			1
EV_WF_SW_WG_2018-10_NP	EV_WF_SW	WG	N	10/24/2018	13:30	G	5		1		1	1		1			1			1
						Total	15													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Ultra-trace Mercury samples are unfiltered and unpreserved	Kimberley Hackett	October 24, 2018		10/25
Total Methyl Mercury samples are preserved but unfiltered				9:10
Total Selenium samples are preserved but unfiltered				
Dissolved Selenium samples are preserved and filtered				

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default) X					
Priority (2-3 business days) - 50% surcharge	Sampler's Name	Kimberley Hackett	Mobile #		
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	October 24, 2018	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

92

Teck Coal Ltd.
ATTN: Lee Wilm
124-B Aspen Dr
Sparwood BC V0B 2G0

Date Received: 28-FEB-18
Report Date: 08-MAR-18 11:00 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2061819

Project P.O. #: n/a
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 01-03_2018-02-20
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061819-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	10:50				
	Client ID	RG_DW-01-03_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	358				
	Hardness (as CaCO3) (mg/L)	200				
	pH (pH)	8.22				
	ORP (mV)	292				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	216				
	Turbidity (NTU)	<0.10				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	1.3				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	156				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	3.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	159				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	0.79				
	Fluoride (F) (mg/L)	0.155				
	Nitrate (as N) (mg/L)	0.441				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.059				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	33.0				
	Anion Sum (meq/L)	3.93				
	Cation Sum (meq/L)	4.06				
	Cation - Anion Balance (%)	1.6				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.54				
	Total Organic Carbon (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00014				
	Barium (Ba)-Total (mg/L)	0.0759				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (ug/L)	0.0122				
	Calcium (Ca)-Total (mg/L)	49.1				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061819-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	10:50				
	Client ID	RG_DW-01-03_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00024				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.0263				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	0.00180				
	Lithium (Li)-Total (mg/L)	0.0026				
	Magnesium (Mg)-Total (mg/L)	12.5				
	Manganese (Mn)-Total (mg/L)	<0.00010				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00109				
	Nickel (Ni)-Total (mg/L)	0.00087				
	Potassium (K)-Total (mg/L)	0.405				
	Selenium (Se)-Total (ug/L)	2.38				
	Silicon (Si)-Total (mg/L)	2.12				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	1.41				
	Strontium (Sr)-Total (mg/L)	0.209				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.000826				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0732				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.0816				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (ug/L)	0.0121				
	Calcium (Ca)-Dissolved (mg/L)	57.8				
	Chromium (Cr)-Dissolved (mg/L)	<0.00030 DLB				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00319				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061819-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	10:50				
	Client ID	RG_DW-01-03_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	0.000367				
	Lithium (Li)-Dissolved (mg/L)	0.0024				
	Magnesium (Mg)-Dissolved (mg/L)	13.4				
	Manganese (Mn)-Dissolved (mg/L)	<0.00010				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000841				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	0.427				
	Selenium (Se)-Dissolved (ug/L)	2.45				
	Silicon (Si)-Dissolved (mg/L)	2.15				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	1.45				
	Strontium (Sr)-Dissolved (mg/L)	0.208				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.000768				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0399				

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Aluminum (Al)-Dissolved	MB-LOR	L2061819-1
Method Blank	Chromium (Cr)-Dissolved	MB-LOR	L2061819-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2061819-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2061819-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2061819-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2061819-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2061819-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2061819-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Reference Information

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Reference Information

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

01-03_2018-02-20

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
124-B Aspen Dr
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R3973940								
WG2725096-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			112.7		%		85-115	01-MAR-18
WG2725096-1 MB								
Acidity (as CaCO3)			1.1		mg/L		2	01-MAR-18
ALK-TITR-VA	**Water**							
Batch R3977070								
WG2725094-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			100.9		%		85-115	02-MAR-18
WG2725094-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	02-MAR-18
BE-D-L-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Beryllium (Be)-Dissolved			96.5		%		80-120	06-MAR-18
WG2726029-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	06-MAR-18
BE-T-L-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Beryllium (Be)-Total			99.2		%		80-120	04-MAR-18
WG2726127-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	04-MAR-18
BR-L-IC-N-VA	**Water**							
Batch R3973277								
WG2725176-2 LCS								
Bromide (Br)			97.0		%		85-115	01-MAR-18
WG2725176-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	01-MAR-18
CARBONS-DOC-VA	**Water**							
Batch R3975791								
WG2725266-4 LCS								
Dissolved Organic Carbon			98.5		%		80-120	02-MAR-18
WG2725266-8 LCS								
Dissolved Organic Carbon			98.2		%		80-120	02-MAR-18
WG2725266-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
WG2725266-7 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R3975791								
WG2725266-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
CARBONS-TOC-VA	**Water**							
Batch R3975788								
WG2725265-1 LCS								
Total Organic Carbon			96.3		%		80-120	02-MAR-18
WG2725265-5 LCS								
Total Organic Carbon			100.2		%		80-120	02-MAR-18
WG2725265-9 LCS								
Total Organic Carbon			95.7		%		80-120	02-MAR-18
WG2725265-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
WG2725265-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
CL-L-IC-N-VA	**Water**							
Batch R3973277								
WG2725176-2 LCS								
Chloride (Cl)			98.1		%		90-110	01-MAR-18
WG2725176-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	01-MAR-18
EC-PCT-VA	**Water**							
Batch R3973940								
WG2725096-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			98.6		%		90-110	01-MAR-18
WG2725096-1 MB								
Conductivity			<2.0		uS/cm		2	01-MAR-18
F-IC-N-VA	**Water**							
Batch R3973277								
WG2725176-2 LCS								
Fluoride (F)			98.6		%		90-110	01-MAR-18
WG2725176-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	01-MAR-18
HG-D-CVAA-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R3974546								
WG2725387-2 LCS								
Mercury (Hg)-Dissolved			100.7		%		80-120	02-MAR-18
WG2725387-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	02-MAR-18
HG-T-CVAA-VA	**Water**							
Batch R3975895								
WG2726229-2 LCS								
Mercury (Hg)-Total			103.8		%		80-120	03-MAR-18
WG2726229-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	03-MAR-18
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Aluminum (Al)-Dissolved			103.7		%		80-120	06-MAR-18
Antimony (Sb)-Dissolved			94.4		%		80-120	06-MAR-18
Arsenic (As)-Dissolved			104.2		%		80-120	06-MAR-18
Barium (Ba)-Dissolved			103.9		%		80-120	06-MAR-18
Bismuth (Bi)-Dissolved			94.5		%		80-120	06-MAR-18
Boron (B)-Dissolved			93.6		%		80-120	06-MAR-18
Cadmium (Cd)-Dissolved			101.7		%		80-120	06-MAR-18
Calcium (Ca)-Dissolved			101.7		%		80-120	06-MAR-18
Chromium (Cr)-Dissolved			104.1		%		80-120	06-MAR-18
Cobalt (Co)-Dissolved			103.2		%		80-120	06-MAR-18
Copper (Cu)-Dissolved			103.8		%		80-120	06-MAR-18
Iron (Fe)-Dissolved			100.6		%		80-120	06-MAR-18
Lead (Pb)-Dissolved			96.3		%		80-120	06-MAR-18
Lithium (Li)-Dissolved			96.9		%		80-120	06-MAR-18
Magnesium (Mg)-Dissolved			100.6		%		80-120	06-MAR-18
Manganese (Mn)-Dissolved			105.3		%		80-120	06-MAR-18
Molybdenum (Mo)-Dissolved			102.4		%		80-120	06-MAR-18
Nickel (Ni)-Dissolved			100.8		%		80-120	06-MAR-18
Potassium (K)-Dissolved			99.7		%		80-120	06-MAR-18
Selenium (Se)-Dissolved			98.9		%		80-120	06-MAR-18
Silicon (Si)-Dissolved			102.1		%		80-120	06-MAR-18
Silver (Ag)-Dissolved			95.5		%		80-120	06-MAR-18
Sodium (Na)-Dissolved			106.7		%		80-120	06-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Strontium (Sr)-Dissolved			98.3		%		80-120	06-MAR-18
Thallium (Tl)-Dissolved			97.3		%		80-120	06-MAR-18
Tin (Sn)-Dissolved			99.3		%		80-120	06-MAR-18
Titanium (Ti)-Dissolved			98.9		%		80-120	06-MAR-18
Uranium (U)-Dissolved			100.7		%		80-120	06-MAR-18
Vanadium (V)-Dissolved			105.1		%		80-120	06-MAR-18
Zinc (Zn)-Dissolved			98.3		%		80-120	06-MAR-18
WG2726029-1 MB		**NP**						
Aluminum (Al)-Dissolved			0.0016	MB-LOR	mg/L		0.001	06-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	06-MAR-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	06-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Chromium (Cr)-Dissolved			0.00012	MB-LOR	mg/L		0.0001	06-MAR-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	06-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	06-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	06-MAR-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	06-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	06-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	06-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-1 MB		**NP**						
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	06-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	06-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	06-MAR-18
MET-T-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Aluminum (Al)-Total			105.7		%		80-120	04-MAR-18
Antimony (Sb)-Total			115.4		%		80-120	04-MAR-18
Arsenic (As)-Total			104.1		%		80-120	04-MAR-18
Barium (Ba)-Total			106.3		%		80-120	04-MAR-18
Bismuth (Bi)-Total			100.5		%		80-120	04-MAR-18
Boron (B)-Total			100.1		%		80-120	04-MAR-18
Cadmium (Cd)-Total			102.3		%		80-120	04-MAR-18
Calcium (Ca)-Total			95.1		%		80-120	04-MAR-18
Chromium (Cr)-Total			101.9		%		80-120	04-MAR-18
Cobalt (Co)-Total			101.9		%		80-120	04-MAR-18
Copper (Cu)-Total			102.7		%		80-120	04-MAR-18
Iron (Fe)-Total			115.5		%		80-120	04-MAR-18
Lead (Pb)-Total			98.8		%		80-120	04-MAR-18
Lithium (Li)-Total			96.9		%		80-120	04-MAR-18
Magnesium (Mg)-Total			108.2		%		80-120	04-MAR-18
Molybdenum (Mo)-Total			107.0		%		80-120	04-MAR-18
Nickel (Ni)-Total			102.3		%		80-120	04-MAR-18
Potassium (K)-Total			110.1		%		80-120	04-MAR-18
Selenium (Se)-Total			101.3		%		80-120	04-MAR-18
Silicon (Si)-Total			107.6		%		80-120	04-MAR-18
Silver (Ag)-Total			100.7		%		80-120	04-MAR-18
Sodium (Na)-Total			109.2		%		80-120	04-MAR-18
Strontium (Sr)-Total			104.5		%		80-120	04-MAR-18
Thallium (Tl)-Total			101.2		%		80-120	04-MAR-18
Tin (Sn)-Total			102.9		%		80-120	04-MAR-18
Titanium (Ti)-Total			97.5		%		80-120	04-MAR-18
Uranium (U)-Total			101.0		%		80-120	04-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Vanadium (V)-Total			102.5		%		80-120	04-MAR-18
Zinc (Zn)-Total			99.5		%		80-120	04-MAR-18
WG2726127-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	04-MAR-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Boron (B)-Total			<0.010		mg/L		0.01	04-MAR-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	04-MAR-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	04-MAR-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Iron (Fe)-Total			<0.010		mg/L		0.01	04-MAR-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	04-MAR-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	04-MAR-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Potassium (K)-Total			<0.050		mg/L		0.05	04-MAR-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Silicon (Si)-Total			<0.10		mg/L		0.1	04-MAR-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Sodium (Na)-Total			<0.050		mg/L		0.05	04-MAR-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	04-MAR-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	04-MAR-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	04-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3978400								
WG2727860-2 LCS								
Aluminum (Al)-Total			99.7		%		80-120	07-MAR-18
Antimony (Sb)-Total			107.4		%		80-120	07-MAR-18
Arsenic (As)-Total			97.0		%		80-120	07-MAR-18
Barium (Ba)-Total			97.5		%		80-120	07-MAR-18
Bismuth (Bi)-Total			100.0		%		80-120	07-MAR-18
Boron (B)-Total			94.3		%		80-120	07-MAR-18
Cadmium (Cd)-Total			95.1		%		80-120	07-MAR-18
Calcium (Ca)-Total			95.5		%		80-120	07-MAR-18
Chromium (Cr)-Total			98.3		%		80-120	07-MAR-18
Cobalt (Co)-Total			97.7		%		80-120	07-MAR-18
Copper (Cu)-Total			96.4		%		80-120	07-MAR-18
Iron (Fe)-Total			95.5		%		80-120	07-MAR-18
Lead (Pb)-Total			98.4		%		80-120	07-MAR-18
Lithium (Li)-Total			96.2		%		80-120	07-MAR-18
Magnesium (Mg)-Total			102.4		%		80-120	07-MAR-18
Manganese (Mn)-Total			98.6		%		80-120	07-MAR-18
Molybdenum (Mo)-Total			105.2		%		80-120	07-MAR-18
Nickel (Ni)-Total			98.3		%		80-120	07-MAR-18
Potassium (K)-Total			92.3		%		80-120	07-MAR-18
Selenium (Se)-Total			99.8		%		80-120	07-MAR-18
Silicon (Si)-Total			99.7		%		80-120	07-MAR-18
Silver (Ag)-Total			100.8		%		80-120	07-MAR-18
Sodium (Na)-Total			100.2		%		80-120	07-MAR-18
Strontium (Sr)-Total			102.7		%		80-120	07-MAR-18
Thallium (Tl)-Total			102.5		%		80-120	07-MAR-18
Tin (Sn)-Total			96.2		%		80-120	07-MAR-18
Titanium (Ti)-Total			86.8		%		80-120	07-MAR-18
Uranium (U)-Total			101.6		%		80-120	07-MAR-18
Vanadium (V)-Total			100.3		%		80-120	07-MAR-18
Zinc (Zn)-Total			94.2		%		80-120	07-MAR-18
WG2727860-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	07-MAR-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	07-MAR-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	07-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3978400								
WG2727860-1 MB								
Barium (Ba)-Total			<0.000050		mg/L		0.00005	07-MAR-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	07-MAR-18
Boron (B)-Total			<0.010		mg/L		0.01	07-MAR-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	07-MAR-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	07-MAR-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	07-MAR-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	07-MAR-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	07-MAR-18
Iron (Fe)-Total			<0.010		mg/L		0.01	07-MAR-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	07-MAR-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	07-MAR-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	07-MAR-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	07-MAR-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	07-MAR-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	07-MAR-18
Potassium (K)-Total			<0.050		mg/L		0.05	07-MAR-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	07-MAR-18
Silicon (Si)-Total			<0.10		mg/L		0.1	07-MAR-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	07-MAR-18
Sodium (Na)-Total			<0.050		mg/L		0.05	07-MAR-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	07-MAR-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	07-MAR-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	07-MAR-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	07-MAR-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	07-MAR-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	07-MAR-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	07-MAR-18
NH3-F-VA	**Water**							
Batch R3978750								
WG2727367-6 LCS								
Ammonia, Total (as N)			96.0		%		85-115	07-MAR-18
WG2727367-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	07-MAR-18
NO2-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-VA	**Water**							
Batch R3973277								
WG2725176-2 LCS								
Nitrite (as N)			97.5		%		90-110	01-MAR-18
WG2725176-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	01-MAR-18
NO3-L-IC-N-VA	**Water**							
Batch R3973277								
WG2725176-2 LCS								
Nitrate (as N)			98.2		%		90-110	01-MAR-18
WG2725176-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	01-MAR-18
ORP-VA	**Water**							
Batch R3973414								
WG2725161-1 CRM		**VA-ORP**						
ORP			220		mV		210-230	01-MAR-18
WG2725161-2 DUP		**L2061819-1**						
ORP		292	285	J	mV	6.5	15	01-MAR-18
P-T-PRES-COL-VA	**Water**							
Batch R3974648								
WG2725372-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			106.2		%		80-120	02-MAR-18
WG2725372-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	02-MAR-18
WG2725372-4 MS		**L2061819-1**						
Phosphorus (P)-Total			103.8		%		70-130	02-MAR-18
PH-PCT-VA	**Water**							
Batch R3973940								
WG2725096-2 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	01-MAR-18
PO4-DO-COL-VA	**Water**							
Batch R3973682								
WG2725271-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			101.9		%		80-120	02-MAR-18
WG2725271-14 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.2		%		80-120	02-MAR-18
WG2725271-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.7		%		80-120	02-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-COL-VA	**Water**							
Batch R3973682								
WG2725271-6 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			92.1		%		80-120	02-MAR-18
WG2725271-3 DUP		**L2061819-1**						
Orthophosphate-Dissolved (as P)		<0.0010	0.0010	RPD-NA	mg/L	N/A	20	02-MAR-18
WG2725271-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
SO4-IC-N-VA	**Water**							
Batch R3973277								
WG2725176-2 LCS								
Sulfate (SO4)			99.3		%		90-110	01-MAR-18
WG2725176-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	01-MAR-18
TDS-LOW-VA	**Water**							
Batch R3975822								
WG2725258-2 LCS								
Total Dissolved Solids			101.0		%		85-115	02-MAR-18
WG2725258-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	02-MAR-18
TKN-F-VA	**Water**							
Batch R3976068								
WG2725895-3 DUP		**L2061819-1**						
Total Kjeldahl Nitrogen		0.059	0.098	J	mg/L	0.039	0.1	04-MAR-18
WG2725895-2 LCS								
Total Kjeldahl Nitrogen			100.2		%		75-125	04-MAR-18
WG2725895-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	04-MAR-18
TSS-LOW-VA	**Water**							
Batch R3975820								
WG2725251-2 LCS								
Total Suspended Solids			95.3		%		85-115	02-MAR-18
WG2725251-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-LOW-VA	**Water**							
Batch R3975820								
WG2725251-1 MB								
Total Suspended Solids			<1.0		mg/L		1	02-MAR-18
TURBIDITY-VA	**Water**							
Batch R3973442								
WG2725218-2 CRM		**VA-FORM-40**						
Turbidity			101.5		%		85-115	01-MAR-18
WG2725218-1 MB								
Turbidity			<0.10		NTU		0.1	01-MAR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	26-FEB-18 10:50	01-MAR-18 20:00	0.25	81	hours	EHTR-FM
Turbidity by Meter							
	1	26-FEB-18 10:50	01-MAR-18 23:47	3	4	days	EHT
pH by Meter (Automated)							
	1	26-FEB-18 10:50	01-MAR-18 08:45	0.25	70	hours	EHTR-FM
Anions and Nutrients							
Diss. Orthophosphate in Water by Colour							
	1	26-FEB-18 10:50	02-MAR-18 01:10	3	4	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2061819 were received on 28-FEB-18 10:20.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

SAMPLING: ☐ Bridge ☐ Shore ☑ Wading ☐ Boat ☐ Other*

EQUIPMENT: ☑ N/A (i.e. filled by hand) ☐ Through Ice ☐ Regular (multi-sampler) ☐ Other*

LOCATION: ☑ Designated ☐ Winter ☐ Other*

DEVIATION FROM PROTOCOLS: ☑ No ☐ Yes*

* Explain in Remarks section

WEATHER: (Circle all that apply) Clear/Sunny, Mainly Sunny, Mostly Cloudy, (Cloudy/Overcast), Fog, Hail, Sleet, Snow

RAIN: (None), Light, Moderate, Heavy

WIND: (None), Light, Moderate, Strong

OTHER WEATHER COMMENTS
(i.e. any precipitation in the last 48hrs? Estimate percent cloud cover)

has rained in past 24hrs
snow covering river banks

SAFETY CONCERNS, EQUIPMENT REQUIRED OR ISSUES

DO meter was very slow to calibrate / stabilize this morning.

SAMPLER REMARKS

Water Level: medium

Flow: medium

Colour/Clarity: clear

Other Comments/Possible Sources of Contamination/Deviation from Protocol/Etc.

OFFICE NOTES

Teck

COC ID:	01-03_2018-02-20	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Lee Wilm			Lab Contact	Can Dang			Email 1:	lee.wilm@teck.com	X	X	X
Email	lee.wilm@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	PO Box 1777, 124B Aspen Drive			Address	8081 Lougheed Hwy			Email 3:	andrew.wight@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-865-5289			Phone Number	604-253-4188			PO number				

SAMPLE DETAILS / **ANALYSIS REQUESTED**

L2061819-COFC

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA
Bottle								F	N	F	N	F	N	N
Preserv.								H2SO4	H2SO4	HCL	HCL	HNO3	HNO3	
RG_DW-01-03_WP_Q1-2018_NP	RG_DW-01-03	WP	N	26-Feb-19	1050	G	7	1	1	1	1	1	1	1

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	A.WIGHT	20 Feb 2018 14:45	JC GC	FEB 28 2018 1020A

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	A.Wight	Mobile #	250-433-1159
Sampler's Signature	A. Wight	Date/Time	February 26, 2018

Teck Coal Ltd.
ATTN: Lee Wilm
124-B Aspen Dr
Sparwood BC V0B 2G0

Date Received: 28-FEB-18
Report Date: 08-MAR-18 11:03 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2061823

Project P.O. #: NOT SUBMITTED
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 01-07_2018-02-20
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061823-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	11:44				
	Client ID	RG_DW-01-07_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	761				
	Hardness (as CaCO3) (mg/L)	458				
	pH (pH)	8.03				
	ORP (mV)	316				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	489				
	Turbidity (NTU)	0.18				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	9.5				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	375				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	375				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.25 DLDS				
	Chloride (Cl) (mg/L)	9.08				
	Fluoride (F) (mg/L)	<0.10 DLDS				
	Nitrate (as N) (mg/L)	0.838				
	Nitrite (as N) (mg/L)	<0.0050 DLDS				
	Total Kjeldahl Nitrogen (mg/L)	0.102				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0016				
	Phosphorus (P)-Total (mg/L)	0.0020				
	Sulfate (SO4) (mg/L)	66.9				
	Anion Sum (meq/L)	9.21				
	Cation Sum (meq/L)	9.45				
	Cation - Anion Balance (%)	1.3				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.89				
	Total Organic Carbon (mg/L)	0.74				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00012				
	Barium (Ba)-Total (mg/L)	0.125				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.020				
	Cadmium (Cd)-Total (ug/L)	0.0481				
	Calcium (Ca)-Total (mg/L)	104				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061823-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	11:44				
	Client ID	RG_DW-01-07_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00019				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.00685				
	Iron (Fe)-Total (mg/L)	0.024				
	Lead (Pb)-Total (mg/L)	0.000164				
	Lithium (Li)-Total (mg/L)	0.0074				
	Magnesium (Mg)-Total (mg/L)	37.5				
	Manganese (Mn)-Total (mg/L)	0.00041				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00424				
	Nickel (Ni)-Total (mg/L)	0.00059				
	Potassium (K)-Total (mg/L)	0.947				
	Selenium (Se)-Total (ug/L)	1.68				
	Silicon (Si)-Total (mg/L)	6.45				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	5.99				
	Strontium (Sr)-Total (mg/L)	0.295				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00175				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0265				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.137				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.018				
	Cadmium (Cd)-Dissolved (ug/L)	0.0463				
	Calcium (Ca)-Dissolved (mg/L)	115				
	Chromium (Cr)-Dissolved (mg/L)	<0.00020 DLB				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00262				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061823-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	11:44				
	Client ID	RG_DW-01-07_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	0.000082				
	Lithium (Li)-Dissolved (mg/L)	0.0068				
	Magnesium (Mg)-Dissolved (mg/L)	41.5				
	Manganese (Mn)-Dissolved (mg/L)	0.00029				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00331				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	0.975				
	Selenium (Se)-Dissolved (ug/L)	1.97				
	Silicon (Si)-Dissolved (mg/L)	6.72				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	6.34				
	Strontium (Sr)-Dissolved (mg/L)	0.291				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00135				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0098				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Aluminum (Al)-Dissolved	MB-LOR	L2061823-1
Method Blank	Chromium (Cr)-Dissolved	MB-LOR	L2061823-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2061823-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2061823-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2061823-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2061823-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2061823-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2061823-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2061823-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2061823-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2061823-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2061823-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2061823-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

Reference Information

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

01-07_2018-02-20

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
124-B Aspen Dr
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R3975673								
WG2725244-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			109.0		%		85-115	02-MAR-18
WG2725244-5 DUP		**L2061823-1**						
Acidity (as CaCO3)		9.5	8.8		mg/L	7.9	20	02-MAR-18
WG2725244-1 MB								
Acidity (as CaCO3)			1.5		mg/L		2	02-MAR-18
ALK-TITR-VA	**Water**							
Batch R3977070								
WG2725094-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			100.9		%		85-115	02-MAR-18
WG2725094-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	02-MAR-18
BE-D-L-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Beryllium (Be)-Dissolved			96.5		%		80-120	06-MAR-18
WG2726029-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	06-MAR-18
BE-T-L-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Beryllium (Be)-Total			99.2		%		80-120	04-MAR-18
WG2726127-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	04-MAR-18
BR-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Bromide (Br)			98.4		%		85-115	02-MAR-18
WG2725240-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	02-MAR-18
CARBONS-DOC-VA	**Water**							
Batch R3975791								
WG2725266-4 LCS								
Dissolved Organic Carbon			98.5		%		80-120	02-MAR-18
WG2725266-8 LCS								
Dissolved Organic Carbon			98.2		%		80-120	02-MAR-18
WG2725266-3 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R3975791								
WG2725266-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
WG2725266-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
CARBONS-TOC-VA	**Water**							
Batch R3975788								
WG2725265-1 LCS								
Total Organic Carbon			96.3		%		80-120	02-MAR-18
WG2725265-5 LCS								
Total Organic Carbon			100.2		%		80-120	02-MAR-18
WG2725265-9 LCS								
Total Organic Carbon			95.7		%		80-120	02-MAR-18
WG2725265-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
WG2725265-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
CL-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Chloride (Cl)			99.7		%		90-110	02-MAR-18
WG2725240-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	02-MAR-18
EC-PCT-VA	**Water**							
Batch R3977070								
WG2725094-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			93.9		%		90-110	02-MAR-18
WG2725094-1 MB								
Conductivity			<2.0		uS/cm		2	02-MAR-18
F-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Fluoride (F)			98.7		%		90-110	02-MAR-18
WG2725240-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	02-MAR-18
HG-D-CVAA-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R3974546								
WG2725387-2 LCS								
Mercury (Hg)-Dissolved			100.7		%		80-120	02-MAR-18
WG2725387-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	02-MAR-18
HG-T-CVAA-VA	**Water**							
Batch R3975895								
WG2726229-2 LCS								
Mercury (Hg)-Total			103.8		%		80-120	03-MAR-18
WG2726229-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	03-MAR-18
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Aluminum (Al)-Dissolved			103.7		%		80-120	06-MAR-18
Antimony (Sb)-Dissolved			94.4		%		80-120	06-MAR-18
Arsenic (As)-Dissolved			104.2		%		80-120	06-MAR-18
Barium (Ba)-Dissolved			103.9		%		80-120	06-MAR-18
Bismuth (Bi)-Dissolved			94.5		%		80-120	06-MAR-18
Boron (B)-Dissolved			93.6		%		80-120	06-MAR-18
Cadmium (Cd)-Dissolved			101.7		%		80-120	06-MAR-18
Calcium (Ca)-Dissolved			101.7		%		80-120	06-MAR-18
Chromium (Cr)-Dissolved			104.1		%		80-120	06-MAR-18
Cobalt (Co)-Dissolved			103.2		%		80-120	06-MAR-18
Copper (Cu)-Dissolved			103.8		%		80-120	06-MAR-18
Iron (Fe)-Dissolved			100.6		%		80-120	06-MAR-18
Lead (Pb)-Dissolved			96.3		%		80-120	06-MAR-18
Lithium (Li)-Dissolved			96.9		%		80-120	06-MAR-18
Magnesium (Mg)-Dissolved			100.6		%		80-120	06-MAR-18
Manganese (Mn)-Dissolved			105.3		%		80-120	06-MAR-18
Molybdenum (Mo)-Dissolved			102.4		%		80-120	06-MAR-18
Nickel (Ni)-Dissolved			100.8		%		80-120	06-MAR-18
Potassium (K)-Dissolved			99.7		%		80-120	06-MAR-18
Selenium (Se)-Dissolved			98.9		%		80-120	06-MAR-18
Silicon (Si)-Dissolved			102.1		%		80-120	06-MAR-18
Silver (Ag)-Dissolved			95.5		%		80-120	06-MAR-18
Sodium (Na)-Dissolved			106.7		%		80-120	06-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Strontium (Sr)-Dissolved			98.3		%		80-120	06-MAR-18
Thallium (Tl)-Dissolved			97.3		%		80-120	06-MAR-18
Tin (Sn)-Dissolved			99.3		%		80-120	06-MAR-18
Titanium (Ti)-Dissolved			98.9		%		80-120	06-MAR-18
Uranium (U)-Dissolved			100.7		%		80-120	06-MAR-18
Vanadium (V)-Dissolved			105.1		%		80-120	06-MAR-18
Zinc (Zn)-Dissolved			98.3		%		80-120	06-MAR-18
WG2726029-1 MB		**NP**						
Aluminum (Al)-Dissolved			0.0016	MB-LOR	mg/L		0.001	06-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	06-MAR-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	06-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Chromium (Cr)-Dissolved			0.00012	MB-LOR	mg/L		0.0001	06-MAR-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	06-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	06-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	06-MAR-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	06-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	06-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	06-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-1 MB		**NP**						
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	06-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	06-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	06-MAR-18
MET-T-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Aluminum (Al)-Total			105.7		%		80-120	04-MAR-18
Antimony (Sb)-Total			115.4		%		80-120	04-MAR-18
Arsenic (As)-Total			104.1		%		80-120	04-MAR-18
Barium (Ba)-Total			106.3		%		80-120	04-MAR-18
Bismuth (Bi)-Total			100.5		%		80-120	04-MAR-18
Boron (B)-Total			100.1		%		80-120	04-MAR-18
Cadmium (Cd)-Total			102.3		%		80-120	04-MAR-18
Calcium (Ca)-Total			95.1		%		80-120	04-MAR-18
Chromium (Cr)-Total			101.9		%		80-120	04-MAR-18
Cobalt (Co)-Total			101.9		%		80-120	04-MAR-18
Copper (Cu)-Total			102.7		%		80-120	04-MAR-18
Iron (Fe)-Total			115.5		%		80-120	04-MAR-18
Lead (Pb)-Total			98.8		%		80-120	04-MAR-18
Lithium (Li)-Total			96.9		%		80-120	04-MAR-18
Magnesium (Mg)-Total			108.2		%		80-120	04-MAR-18
Manganese (Mn)-Total			102.6		%		80-120	04-MAR-18
Molybdenum (Mo)-Total			107.0		%		80-120	04-MAR-18
Nickel (Ni)-Total			102.3		%		80-120	04-MAR-18
Potassium (K)-Total			110.1		%		80-120	04-MAR-18
Selenium (Se)-Total			101.3		%		80-120	04-MAR-18
Silicon (Si)-Total			107.6		%		80-120	04-MAR-18
Silver (Ag)-Total			100.7		%		80-120	04-MAR-18
Sodium (Na)-Total			109.2		%		80-120	04-MAR-18
Strontium (Sr)-Total			104.5		%		80-120	04-MAR-18
Thallium (Tl)-Total			101.2		%		80-120	04-MAR-18
Tin (Sn)-Total			102.9		%		80-120	04-MAR-18
Titanium (Ti)-Total			97.5		%		80-120	04-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Uranium (U)-Total			101.0		%		80-120	04-MAR-18
Vanadium (V)-Total			102.5		%		80-120	04-MAR-18
Zinc (Zn)-Total			99.5		%		80-120	04-MAR-18
WG2726127-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	04-MAR-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Boron (B)-Total			<0.010		mg/L		0.01	04-MAR-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	04-MAR-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	04-MAR-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Iron (Fe)-Total			<0.010		mg/L		0.01	04-MAR-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	04-MAR-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	04-MAR-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Potassium (K)-Total			<0.050		mg/L		0.05	04-MAR-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Silicon (Si)-Total			<0.10		mg/L		0.1	04-MAR-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Sodium (Na)-Total			<0.050		mg/L		0.05	04-MAR-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	04-MAR-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	04-MAR-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	04-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Water**							
Batch R3978750								
WG2727367-6 LCS								
Ammonia, Total (as N)			96.0		%		85-115	07-MAR-18
WG2727367-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	07-MAR-18
NO2-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Nitrite (as N)			98.1		%		90-110	02-MAR-18
WG2725240-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	02-MAR-18
NO3-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Nitrate (as N)			100.6		%		90-110	02-MAR-18
WG2725240-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	02-MAR-18
ORP-VA	**Water**							
Batch R3973414								
WG2725161-1 CRM		**VA-ORP**						
ORP			220		mV		210-230	01-MAR-18
P-T-PRES-COL-VA	**Water**							
Batch R3974648								
WG2725372-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			106.2		%		80-120	02-MAR-18
WG2725372-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	02-MAR-18
PH-PCT-VA	**Water**							
Batch R3977070								
WG2725094-2 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	02-MAR-18
PO4-DO-COL-VA	**Water**							
Batch R3973682								
WG2725271-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			101.9		%		80-120	02-MAR-18
WG2725271-14 CRM		**VA-OPO4-CONTROL**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-COL-VA	**Water**							
Batch R3973682								
WG2725271-14 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.2		%		80-120	02-MAR-18
WG2725271-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.7		%		80-120	02-MAR-18
WG2725271-6 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			92.1		%		80-120	02-MAR-18
WG2725271-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-4 MS		**L2061823-1**						
Orthophosphate-Dissolved (as P)			102.3		%		70-130	02-MAR-18
SO4-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Sulfate (SO4)			100.8		%		90-110	02-MAR-18
WG2725240-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	02-MAR-18
TDS-LOW-VA	**Water**							
Batch R3975822								
WG2725258-2 LCS								
Total Dissolved Solids			101.0		%		85-115	02-MAR-18
WG2725258-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	02-MAR-18
TKN-F-VA	**Water**							
Batch R3976068								
WG2725895-2 LCS								
Total Kjeldahl Nitrogen			100.2		%		75-125	04-MAR-18
WG2725895-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	04-MAR-18
WG2725895-4 MS		**L2061823-1**						
Total Kjeldahl Nitrogen			101.1		%		70-130	04-MAR-18
TSS-LOW-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-LOW-VA	**Water**							
Batch R3975820								
WG2725251-2 LCS								
Total Suspended Solids			95.3		%		85-115	02-MAR-18
WG2725251-1 MB								
Total Suspended Solids			<1.0		mg/L		1	02-MAR-18
TURBIDITY-VA	**Water**							
Batch R3973442								
WG2725218-2 CRM		**VA-FORM-40**						
Turbidity			101.5		%		85-115	01-MAR-18
WG2725218-1 MB								
Turbidity			<0.10		NTU		0.1	01-MAR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	26-FEB-18 11:44	01-MAR-18 20:00	0.25	80	hours	EHTR-FM
Turbidity by Meter							
	1	26-FEB-18 11:44	01-MAR-18 23:47	3	4	days	EHT
pH by Meter (Automated)							
	1	26-FEB-18 11:44	02-MAR-18 11:50	0.25	96	hours	EHTR-FM
Anions and Nutrients							
Diss. Orthophosphate in Water by Colour							
	1	26-FEB-18 11:44	02-MAR-18 01:13	3	4	days	EHT
Nitrate in Water by IC (Low Level)							
	1	26-FEB-18 11:44	02-MAR-18 07:02	3	4	days	EHT
Nitrite in Water by IC (Low Level)							
	1	26-FEB-18 11:44	02-MAR-18 07:02	3	4	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2061823 were received on 28-FEB-18 10:20.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 01-07_2018-02-20 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Lee Wilm			Lab Contact	Can Dang			Email 1:	lee.wilm@teck.com	X	X	X
Email	lee.wilm@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	PO Box 1777, 124B Aspen Drive			Address	8081 Lougheed Hwy			Email 3:	andrew.wight@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-865-5289			Phone Number	604-253-4188			PO number				

SAMPLE DETAILS / ANALYSIS REQUESTED

L2061823-COFC

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
BOTTLE								F	N	F	N	F	N	N					
PRESERVE								H2SO4	H2SO4	HCL	HCL	HNO3	HNO3						
RG_DW-01-07_WP_Q1-2018_NP	RG_DW-01-07	WP		26-Feb-18	1144	G	7	1	1	1	1	1	1	1					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	A. WIGHT	20 Feb 2018 14:45	JC 6'C	FEB 28 2018 10 20 AM

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	A.Wight	Mobile #	250-433-1159
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	A. Wight	Date/Time	February 26, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck Coal Ltd.
ATTN: Lee Wilm
124-B Aspen Dr
Sparwood BC V0B 2G0

Date Received: 15-FEB-18
Report Date: 21-FEB-18 16:53 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2057114

Project P.O. #: VPO 489057
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 02-20_2018-02-13
Legal Site Desc:

Comments:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2057114-1	L2057114-2	L2057114-3	L2057114-4	
	Description	WP	WP	WP	WP	
	Sampled Date	13-FEB-18	13-FEB-18	13-FEB-18	13-FEB-18	
	Sampled Time	11:20	11:20	11:20	11:20	
	Client ID	RG_DW-02-20_WP_Q1-2018_NP	RG_DW-D_WP_Q1-2018_NP	RG_DW-F_WP_Q1-2018_NP	RG_DW-T_WP_Q1-2018_NP	
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	476	474	<2.0	<2.0	
	Hardness (as CaCO3) (mg/L)	257	261	<0.50	<0.50 HTC	
	pH (pH)	8.06	8.00	5.43	5.47	
	ORP (mV)	305	309	375	390	
	Total Suspended Solids (mg/L)	1.2	1.1	<1.0	<1.0	
	Total Dissolved Solids (mg/L)	300	298	<3.0	<3.0	
	Turbidity (NTU)	2.95	3.93	0.12	<0.10	
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	4.4	4.5	1.6	1.7	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	168	167	<1.0	<1.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	168	167	<1.0	<1.0	
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	2.65	2.65	<0.10	<0.10	
	Fluoride (F) (mg/L)	0.195	0.195	<0.020	<0.020	
	Nitrate (as N) (mg/L)	2.73	2.74	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.155 TKNI	0.152 TKNI	<0.050	<0.050	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	
	Sulfate (SO4) (mg/L)	75.4	75.6	<0.30	<0.30	
	Anion Sum (meq/L)	5.20	5.19	<0.10	<0.10	
	Cation Sum (meq/L)	5.27	5.34	<0.10	<0.10	
	Cation - Anion Balance (%)	0.7	1.4	0.0	0.0	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.74	0.50	<0.50		
	Total Organic Carbon (mg/L)	0.53	<0.50	<0.50	<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Total (mg/L)	0.00011	0.00010	<0.00010	<0.00010	
	Barium (Ba)-Total (mg/L)	0.0904	0.0925	<0.000050	<0.000050	
	Beryllium (Be)-Total (ug/L)	<0.020	<0.020	<0.020	<0.020	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (ug/L)	0.0086	0.0095	<0.0050	<0.0050	
	Calcium (Ca)-Total (mg/L)	72.8	72.6	<0.050	<0.050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2057114-1	L2057114-2	L2057114-3	L2057114-4	
	Description	WP	WP	WP	WP	
	Sampled Date	13-FEB-18	13-FEB-18	13-FEB-18	13-FEB-18	
	Sampled Time	11:20	11:20	11:20	11:20	
	Client ID	RG_DW-02-20_WP_Q1-2018_NP	RG_DW-D_WP_Q1-2018_NP	RG_DW-F_WP_Q1-2018_NP	RG_DW-T_WP_Q1-2018_NP	
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00022	0.00027	<0.00010	<0.00010	
	Cobalt (Co)-Total (ug/L)	<0.10	<0.10	<0.10	<0.10	
	Copper (Cu)-Total (mg/L)	0.00393	0.00761	<0.00050	<0.00050	
	Iron (Fe)-Total (mg/L)	0.233	0.273	<0.010	<0.010	
	Lead (Pb)-Total (mg/L)	0.000246	0.000387	<0.000050	<0.000050	
	Lithium (Li)-Total (mg/L)	0.0068	0.0068	<0.0010	<0.0010	
	Magnesium (Mg)-Total (mg/L)	20.6	20.5	<0.10	<0.10	
	Manganese (Mn)-Total (mg/L)	0.00616	0.00645	<0.00010	<0.00010	
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Total (mg/L)	0.000970	0.00100	<0.000050	<0.000050	
	Nickel (Ni)-Total (mg/L)	0.00130	0.00275	<0.00050	<0.00050	
	Potassium (K)-Total (mg/L)	0.601	0.595	<0.050	<0.050	
	Selenium (Se)-Total (ug/L)	12.4	12.0	<0.050	<0.050	
	Silicon (Si)-Total (mg/L)	2.26	2.29	<0.10	<0.10	
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	2.66	2.70	<0.050	<0.050	
	Strontium (Sr)-Total (mg/L)	0.239	0.243	<0.00020	<0.00020	
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Total (mg/L)	0.00107	0.00108	<0.000010	<0.000010	
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Total (mg/L)	0.0202	0.0311	<0.0030	<0.0030	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0030	<0.0030	<0.0030		
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Barium (Ba)-Dissolved (mg/L)	0.0888	0.0917	<0.000050		
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Cadmium (Cd)-Dissolved (ug/L)	0.0060	0.0070	<0.0050		
	Calcium (Ca)-Dissolved (mg/L)	71.4	72.5	<0.050		
	Chromium (Cr)-Dissolved (mg/L)	0.00019	0.00024	<0.00010		
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10		
	Copper (Cu)-Dissolved (mg/L)	0.00311	0.00458	<0.00050		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2057114-1	L2057114-2	L2057114-3	L2057114-4	
	Description	WP	WP	WP	WP	
	Sampled Date	13-FEB-18	13-FEB-18	13-FEB-18	13-FEB-18	
	Sampled Time	11:20	11:20	11:20	11:20	
	Client ID	RG_DW-02-20_WP_Q1-2018_NP	RG_DW-D_WP_Q1-2018_NP	RG_DW-F_WP_Q1-2018_NP	RG_DW-T_WP_Q1-2018_NP	
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010	0.011	<0.010		
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000071	<0.000050		
	Lithium (Li)-Dissolved (mg/L)	0.0064	0.0064	<0.0010		
	Magnesium (Mg)-Dissolved (mg/L)	19.2	19.3	<0.10		
	Manganese (Mn)-Dissolved (mg/L)	0.00339	0.00339	<0.00010		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.00102	0.00101	<0.000050		
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Potassium (K)-Dissolved (mg/L)	0.596	0.589	<0.050		
	Selenium (Se)-Dissolved (ug/L)	12.3	12.5	<0.050		
	Silicon (Si)-Dissolved (mg/L)	2.15	2.10	<0.050		
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	2.50	2.62	<0.050		
	Strontium (Sr)-Dissolved (mg/L)	0.241	0.250	<0.00020		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	0.000980	0.000987	<0.000010		
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	0.0071	0.0112	<0.0030		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Sodium (Na)-Dissolved	B	L2057114-3
Laboratory Control Sample	Sodium (Na)-Total	MES	L2057114-1, -2, -3, -4
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2057114-1, -2, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2057114-3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2057114-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2057114-3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2057114-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2057114-3
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2057114-3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2057114-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2057114-3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2057114-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2057114-3
Matrix Spike	Barium (Ba)-Total	MS-B	L2057114-1, -2, -3, -4
Matrix Spike	Calcium (Ca)-Total	MS-B	L2057114-1, -2, -3, -4
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2057114-1, -2, -3, -4
Matrix Spike	Manganese (Mn)-Total	MS-B	L2057114-1, -2, -3, -4
Matrix Spike	Strontium (Sr)-Total	MS-B	L2057114-1, -2, -3, -4
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2057114-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

Reference Information

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA Water Chloride in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

02-20_2018-02-13

GLOSSARY OF REPORT TERMS
Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
124-B Aspen Dr
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R3964667								
WG2717862-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			112.9		%		85-115	16-FEB-18
WG2717862-1 MB								
Acidity (as CaCO3)			1.3		mg/L		2	16-FEB-18
Batch R3966660								
WG2718790-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			111.4		%		85-115	20-FEB-18
WG2718790-1 MB								
Acidity (as CaCO3)			1.4		mg/L		2	20-FEB-18
ALK-TITR-VA	**Water**							
Batch R3962517								
WG2717865-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			103.3		%		85-115	16-FEB-18
WG2717865-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	16-FEB-18
BE-D-L-CCMS-VA	**Water**							
Batch R3966469								
WG2718398-2 LCS								
Beryllium (Be)-Dissolved			98.3		%		80-120	18-FEB-18
WG2718398-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	18-FEB-18
BE-T-L-CCMS-VA	**Water**							
Batch R3966387								
WG2718394-2 LCS								
Beryllium (Be)-Total			107.2		%		80-120	19-FEB-18
WG2718394-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	19-FEB-18
BR-L-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-3 DUP		**L2057114-4**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	16-FEB-18
WG2717860-2 LCS								
Bromide (Br)			97.7		%		85-115	16-FEB-18
WG2717860-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	16-FEB-18
WG2717860-4 MS		**L2057114-3**						
Bromide (Br)			104.2		%		75-125	16-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R3963572								
WG2717568-1 DUP		**L2057114-1**						
Dissolved Organic Carbon		0.74	0.61		mg/L	20	20	16-FEB-18
WG2717568-12 LCS								
Dissolved Organic Carbon			94.3		%		80-120	16-FEB-18
WG2717568-4 LCS								
Dissolved Organic Carbon			94.2		%		80-120	16-FEB-18
WG2717568-8 LCS								
Dissolved Organic Carbon			94.2		%		80-120	16-FEB-18
WG2717568-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
WG2717568-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
WG2717568-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
WG2717568-2 MS		**L2057114-2**						
Dissolved Organic Carbon			100.9		%		70-130	16-FEB-18
CARBONS-TOC-VA	**Water**							
Batch R3963571								
WG2717567-2 DUP		**L2057114-1**						
Total Organic Carbon		0.53	<0.50	RPD-NA	mg/L	N/A	20	16-FEB-18
WG2717567-1 LCS								
Total Organic Carbon			95.1		%		80-120	16-FEB-18
WG2717567-13 LCS								
Total Organic Carbon			92.9		%		80-120	16-FEB-18
WG2717567-5 LCS								
Total Organic Carbon			94.1		%		80-120	16-FEB-18
WG2717567-9 LCS								
Total Organic Carbon			92.9		%		80-120	16-FEB-18
WG2717567-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
WG2717567-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
WG2717567-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
WG2717567-3 MS		**L2057114-2**						
Total Organic Carbon			99.0		%		70-130	16-FEB-18
CL-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-L-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-3 DUP		**L2057114-4**						
Chloride (Cl)		<0.10	<0.10	RPD-NA	mg/L	N/A	20	16-FEB-18
WG2717860-2 LCS								
Chloride (Cl)			98.3		%		90-110	16-FEB-18
WG2717860-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	16-FEB-18
WG2717860-4 MS		**L2057114-3**						
Chloride (Cl)			104.5		%		75-125	16-FEB-18
EC-PCT-VA	**Water**							
Batch R3964667								
WG2717862-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			99.7		%		90-110	16-FEB-18
WG2717862-1 MB								
Conductivity			<2.0		uS/cm		2	16-FEB-18
F-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-3 DUP		**L2057114-4**						
Fluoride (F)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	16-FEB-18
WG2717860-2 LCS								
Fluoride (F)			99.0		%		90-110	16-FEB-18
WG2717860-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	16-FEB-18
WG2717860-4 MS		**L2057114-3**						
Fluoride (F)			103.4		%		75-125	16-FEB-18
HG-D-CVAA-VA	**Water**							
Batch R3966424								
WG2718673-10 LCS								
Mercury (Hg)-Dissolved			99.6		%		80-120	20-FEB-18
WG2718673-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	20-FEB-18
HG-T-CVAA-VA	**Water**							
Batch R3962321								
WG2717713-5 DUP		**L2057114-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	16-FEB-18
WG2717713-2 LCS								
Mercury (Hg)-Total			100.6		%		80-120	16-FEB-18
WG2717713-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-VA	**Water**							
Batch R3962321								
WG2717713-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	16-FEB-18
WG2717713-6 MS		**L2057114-2**						
Mercury (Hg)-Total			103.4		%		70-130	16-FEB-18
MET-D-CCMS-VA	**Water**							
Batch R3966469								
WG2718398-2 LCS								
Aluminum (Al)-Dissolved			108.3		%		80-120	18-FEB-18
Antimony (Sb)-Dissolved			95.5		%		80-120	18-FEB-18
Arsenic (As)-Dissolved			95.4		%		80-120	18-FEB-18
Barium (Ba)-Dissolved			104.3		%		80-120	18-FEB-18
Bismuth (Bi)-Dissolved			97.5		%		80-120	18-FEB-18
Boron (B)-Dissolved			89.4		%		80-120	18-FEB-18
Cadmium (Cd)-Dissolved			101.5		%		80-120	18-FEB-18
Calcium (Ca)-Dissolved			108.0		%		80-120	18-FEB-18
Chromium (Cr)-Dissolved			102.5		%		80-120	18-FEB-18
Cobalt (Co)-Dissolved			104.6		%		80-120	18-FEB-18
Copper (Cu)-Dissolved			101.1		%		80-120	18-FEB-18
Iron (Fe)-Dissolved			108.0		%		80-120	18-FEB-18
Lead (Pb)-Dissolved			99.3		%		80-120	18-FEB-18
Lithium (Li)-Dissolved			101.8		%		80-120	18-FEB-18
Magnesium (Mg)-Dissolved			112.0		%		80-120	18-FEB-18
Manganese (Mn)-Dissolved			105.4		%		80-120	18-FEB-18
Molybdenum (Mo)-Dissolved			100.4		%		80-120	18-FEB-18
Nickel (Ni)-Dissolved			104.9		%		80-120	18-FEB-18
Potassium (K)-Dissolved			107.7		%		80-120	18-FEB-18
Selenium (Se)-Dissolved			100.5		%		80-120	18-FEB-18
Silicon (Si)-Dissolved			99.1		%		80-120	18-FEB-18
Silver (Ag)-Dissolved			96.1		%		80-120	18-FEB-18
Strontium (Sr)-Dissolved			108.8		%		80-120	18-FEB-18
Thallium (Tl)-Dissolved			97.4		%		80-120	18-FEB-18
Tin (Sn)-Dissolved			95.3		%		80-120	18-FEB-18
Titanium (Ti)-Dissolved			94.3		%		80-120	18-FEB-18
Uranium (U)-Dissolved			100.5		%		80-120	18-FEB-18
Vanadium (V)-Dissolved			106.8		%		80-120	18-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3966469								
WG2718398-2 LCS								
Zinc (Zn)-Dissolved			90.5		%		80-120	18-FEB-18
WG2718398-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	18-FEB-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	18-FEB-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	18-FEB-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	18-FEB-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	18-FEB-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	18-FEB-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	18-FEB-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	18-FEB-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	18-FEB-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	18-FEB-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	18-FEB-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	18-FEB-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	18-FEB-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	18-FEB-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	18-FEB-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	18-FEB-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	18-FEB-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	18-FEB-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	18-FEB-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	18-FEB-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	18-FEB-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	18-FEB-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	18-FEB-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	18-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3966642								
WG2718398-2 LCS								
Sodium (Na)-Dissolved			93.7		%		80-120	20-FEB-18
WG2719300-2 LCS								
Aluminum (Al)-Dissolved			100.2		%		80-120	20-FEB-18
Antimony (Sb)-Dissolved			98.3		%		80-120	20-FEB-18
Arsenic (As)-Dissolved			96.9		%		80-120	20-FEB-18
Barium (Ba)-Dissolved			101.7		%		80-120	20-FEB-18
Bismuth (Bi)-Dissolved			92.6		%		80-120	20-FEB-18
Boron (B)-Dissolved			89.4		%		80-120	20-FEB-18
Cadmium (Cd)-Dissolved			105.3		%		80-120	20-FEB-18
Calcium (Ca)-Dissolved			103.3		%		80-120	20-FEB-18
Chromium (Cr)-Dissolved			99.2		%		80-120	20-FEB-18
Cobalt (Co)-Dissolved			99.4		%		80-120	20-FEB-18
Copper (Cu)-Dissolved			99.0		%		80-120	20-FEB-18
Iron (Fe)-Dissolved			96.4		%		80-120	20-FEB-18
Lead (Pb)-Dissolved			93.8		%		80-120	20-FEB-18
Lithium (Li)-Dissolved			107.9		%		80-120	20-FEB-18
Magnesium (Mg)-Dissolved			107.2		%		80-120	20-FEB-18
Manganese (Mn)-Dissolved			103.2		%		80-120	20-FEB-18
Molybdenum (Mo)-Dissolved			95.5		%		80-120	20-FEB-18
Nickel (Ni)-Dissolved			99.8		%		80-120	20-FEB-18
Potassium (K)-Dissolved			97.3		%		80-120	20-FEB-18
Selenium (Se)-Dissolved			96.9		%		80-120	20-FEB-18
Silicon (Si)-Dissolved			98.1		%		80-120	20-FEB-18
Silver (Ag)-Dissolved			91.6		%		80-120	20-FEB-18
Sodium (Na)-Dissolved			97.3		%		80-120	20-FEB-18
Strontium (Sr)-Dissolved			96.0		%		80-120	20-FEB-18
Thallium (Tl)-Dissolved			99.8		%		80-120	20-FEB-18
Tin (Sn)-Dissolved			94.9		%		80-120	20-FEB-18
Titanium (Ti)-Dissolved			84.7		%		80-120	20-FEB-18
Uranium (U)-Dissolved			93.1		%		80-120	20-FEB-18
Vanadium (V)-Dissolved			100.6		%		80-120	20-FEB-18
Zinc (Zn)-Dissolved			93.9		%		80-120	20-FEB-18
WG2719300-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	20-FEB-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3966642								
WG2719300-1 MB		**NP**						
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	20-FEB-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	20-FEB-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	20-FEB-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	20-FEB-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	20-FEB-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	20-FEB-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	20-FEB-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	20-FEB-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	20-FEB-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	20-FEB-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	20-FEB-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	20-FEB-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	20-FEB-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	20-FEB-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	20-FEB-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	20-FEB-18
Sodium (Na)-Dissolved			0.051	B	mg/L		0.05	20-FEB-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	20-FEB-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	20-FEB-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	20-FEB-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	20-FEB-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	20-FEB-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	20-FEB-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	20-FEB-18
MET-T-CCMS-VA	**Water**							
Batch R3966387								
WG2718394-2 LCS								
Aluminum (Al)-Total			118.0		%		80-120	19-FEB-18
Antimony (Sb)-Total			101.7		%		80-120	19-FEB-18
Arsenic (As)-Total			104.1		%		80-120	19-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3966387								
WG2718394-2 LCS								
Barium (Ba)-Total			107.3		%		80-120	19-FEB-18
Bismuth (Bi)-Total			112.1		%		80-120	19-FEB-18
Boron (B)-Total			90.6		%		80-120	19-FEB-18
Cadmium (Cd)-Total			108.7		%		80-120	19-FEB-18
Calcium (Ca)-Total			111.7		%		80-120	19-FEB-18
Chromium (Cr)-Total			110.7		%		80-120	19-FEB-18
Cobalt (Co)-Total			108.4		%		80-120	19-FEB-18
Copper (Cu)-Total			109.4		%		80-120	19-FEB-18
Iron (Fe)-Total			98.1		%		80-120	19-FEB-18
Lead (Pb)-Total			107.2		%		80-120	19-FEB-18
Lithium (Li)-Total			110.2		%		80-120	19-FEB-18
Magnesium (Mg)-Total			108.6		%		80-120	19-FEB-18
Manganese (Mn)-Total			110.2		%		80-120	19-FEB-18
Molybdenum (Mo)-Total			97.9		%		80-120	19-FEB-18
Nickel (Ni)-Total			111.3		%		80-120	19-FEB-18
Potassium (K)-Total			108.9		%		80-120	19-FEB-18
Selenium (Se)-Total			97.7		%		80-120	19-FEB-18
Silicon (Si)-Total			97.2		%		80-120	19-FEB-18
Silver (Ag)-Total			96.8		%		80-120	19-FEB-18
Sodium (Na)-Total			121.0	MES	%		80-120	19-FEB-18
Strontium (Sr)-Total			100.4		%		80-120	19-FEB-18
Thallium (Tl)-Total			109.5		%		80-120	19-FEB-18
Tin (Sn)-Total			99.4		%		80-120	19-FEB-18
Titanium (Ti)-Total			102.4		%		80-120	19-FEB-18
Uranium (U)-Total			103.7		%		80-120	19-FEB-18
Vanadium (V)-Total			112.8		%		80-120	19-FEB-18
Zinc (Zn)-Total			103.7		%		80-120	19-FEB-18
WG2718394-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	19-FEB-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	19-FEB-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	19-FEB-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	19-FEB-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	19-FEB-18
Boron (B)-Total			<0.010		mg/L		0.01	19-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3966387								
WG2718394-1 MB								
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	19-FEB-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	19-FEB-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	19-FEB-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	19-FEB-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	19-FEB-18
Iron (Fe)-Total			<0.010		mg/L		0.01	19-FEB-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	19-FEB-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	19-FEB-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	19-FEB-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	19-FEB-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	19-FEB-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	19-FEB-18
Potassium (K)-Total			<0.050		mg/L		0.05	19-FEB-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	19-FEB-18
Silicon (Si)-Total			<0.10		mg/L		0.1	19-FEB-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	19-FEB-18
Sodium (Na)-Total			<0.050		mg/L		0.05	19-FEB-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	19-FEB-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	19-FEB-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	19-FEB-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	19-FEB-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	19-FEB-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	19-FEB-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	19-FEB-18
NH3-F-VA	**Water**							
Batch R3965149								
WG2718532-7 DUP		**L2057114-4**						
Ammonia, Total (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	19-FEB-18
WG2718532-6 LCS								
Ammonia, Total (as N)			98.4		%		85-115	19-FEB-18
WG2718532-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	19-FEB-18
WG2718532-8 MS		**L2057114-4**						
Ammonia, Total (as N)			92.1		%		75-125	19-FEB-18
NO2-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-3 DUP		**L2057114-4**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	16-FEB-18
WG2717860-2 LCS								
Nitrite (as N)			97.8		%		90-110	16-FEB-18
WG2717860-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	16-FEB-18
WG2717860-4 MS		**L2057114-3**						
Nitrite (as N)			103.4		%		75-125	16-FEB-18
NO3-L-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-3 DUP		**L2057114-4**						
Nitrate (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	16-FEB-18
WG2717860-2 LCS								
Nitrate (as N)			98.6		%		90-110	16-FEB-18
WG2717860-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	16-FEB-18
WG2717860-4 MS		**L2057114-3**						
Nitrate (as N)			104.7		%		75-125	16-FEB-18
ORP-VA	**Water**							
Batch R3964117								
WG2718338-1 CRM		**VA-ORP**						
ORP			222		mV		210-230	17-FEB-18
WG2718338-2 DUP		**L2057114-1**						
ORP		305	303	J	mV	2.2	15	17-FEB-18
P-T-PRES-COL-VA	**Water**							
Batch R3962544								
WG2717405-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			104.2		%		80-120	16-FEB-18
WG2717405-6 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			100.0		%		80-120	16-FEB-18
WG2717405-3 DUP		**L2057114-1**						
Phosphorus (P)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	16-FEB-18
WG2717405-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	16-FEB-18
WG2717405-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	16-FEB-18
WG2717405-4 MS		**L2057114-2**						
Phosphorus (P)-Total			99.4		%		70-130	16-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-PCT-VA	**Water**							
Batch R3964667								
WG2717862-2 CRM		**VA-PH7-BUF**						
pH			7.04		pH		6.9-7.1	16-FEB-18
PO4-DO-COL-VA	**Water**							
Batch R3962018								
WG2717384-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			95.0		%		80-120	16-FEB-18
WG2717384-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			93.2		%		80-120	16-FEB-18
WG2717384-6 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			92.7		%		80-120	16-FEB-18
WG2717384-7 DUP		**L2057114-1**						
Orthophosphate-Dissolved (as P)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	16-FEB-18
WG2717384-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	16-FEB-18
WG2717384-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	16-FEB-18
WG2717384-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	16-FEB-18
WG2717384-8 MS		**L2057114-2**						
Orthophosphate-Dissolved (as P)			101.5		%		70-130	16-FEB-18
SO4-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-3 DUP		**L2057114-4**						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	16-FEB-18
WG2717860-2 LCS								
Sulfate (SO4)			99.4		%		90-110	16-FEB-18
WG2717860-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	16-FEB-18
WG2717860-4 MS		**L2057114-3**						
Sulfate (SO4)			105.4		%		75-125	16-FEB-18
TDS-LOW-VA	**Water**							
Batch R3963918								
WG2717853-3 DUP		**L2057114-1**						
Total Dissolved Solids		300	283		mg/L	5.8	20	16-FEB-18
WG2717853-2 LCS								
Total Dissolved Solids			100.9		%		85-115	16-FEB-18
WG2717853-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TDS-LOW-VA	**Water**							
Batch R3963918								
WG2717853-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	16-FEB-18
TKN-F-VA	**Water**							
Batch R3963780								
WG2717099-6 LCS								
Total Kjeldahl Nitrogen			102.0		%		75-125	17-FEB-18
WG2717099-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	17-FEB-18
TSS-LOW-VA	**Water**							
Batch R3963810								
WG2717442-2 LCS								
Total Suspended Solids			104.0		%		85-115	16-FEB-18
WG2717442-1 MB								
Total Suspended Solids			<1.0		mg/L		1	16-FEB-18
TURBIDITY-VA	**Water**							
Batch R3961965								
WG2717320-11 CRM		**VA-FORM-40**						
Turbidity			94.5		%		85-115	15-FEB-18
WG2717320-14 CRM		**VA-FORM-40**						
Turbidity			94.3		%		85-115	15-FEB-18
WG2717320-17 CRM		**VA-FORM-40**						
Turbidity			95.0		%		85-115	15-FEB-18
WG2717320-2 CRM		**VA-FORM-40**						
Turbidity			93.8		%		85-115	15-FEB-18
WG2717320-5 CRM		**VA-FORM-40**						
Turbidity			94.8		%		85-115	15-FEB-18
WG2717320-8 CRM		**VA-FORM-40**						
Turbidity			94.5		%		85-115	15-FEB-18
WG2717320-1 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18
WG2717320-10 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18
WG2717320-13 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18
WG2717320-16 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18
WG2717320-4 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-VA	**Water**							
Batch R3961965								
WG2717320-4 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18
WG2717320-7 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	13-FEB-18 11:20	17-FEB-18 15:00	0.25	100	hours	EHTR-FM
	2	13-FEB-18 11:20	17-FEB-18 15:00	0.25	100	hours	EHTR-FM
	3	13-FEB-18 11:20	17-FEB-18 15:00	0.25	100	hours	EHTR-FM
	4	13-FEB-18 11:20	17-FEB-18 15:00	0.25	100	hours	EHTR-FM
pH by Meter (Automated)							
	1	13-FEB-18 11:20	16-FEB-18 10:47	0.25	72	hours	EHTR-FM
	2	13-FEB-18 11:20	16-FEB-18 10:47	0.25	72	hours	EHTR-FM
	3	13-FEB-18 11:20	16-FEB-18 10:47	0.25	72	hours	EHTR-FM
	4	13-FEB-18 11:20	16-FEB-18 10:47	0.25	72	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2057114 were received on 15-FEB-18 11:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	02-20_2018-02-13	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Lee Wilm			Lab Contact	Can Dang			Email 1:	lee.wilm@teck.com	X	X	X
Email	lee.wilm@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	PO Box 1777, 124B Aspen Drive			Address	8081 Lougheed Hwy			Email 3:	andrew.wight@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-865-5289			Phone Number	604-253-4188			PO number				

L2057114-COFC

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Filter	F	N	F	N	F	N	N				
								Preserve	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3					
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Analysis	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA				
RG_DW-02-20_WP_Q1-2018_NP	RG_DW-02-20	WP		13-Feb-18	1120	G	7		1	1	1	1	1	1	1				
RG_DW-D_WP_Q1-2018_NP	RG_DW-D	WP		13-Feb-18	1120	G	7		1	1	1	1	1	1	1				
RG_DW-F_WP_Q1-2018_NP	RG_DW-F	WP		13-Feb-18	1120	G	7		1	1	1	1	1	1	1				
RG_DW-T_WP_Q1-2018_NP	RG_DW-T	WP		13-Feb-18	1120	G	4			1		1		1	1				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	A. WIGHT	13 Feb '18 1500	JC 5'C (Z4)	FEB 15 2018 1110 Am

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	A.Wight	Mobile #	250-433-1159
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	A. Wight	Date/Time	~~14 Feb 2018 1500~~ 13 Feb 2018 1500
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck Coal Ltd.
ATTN: Lee Wilm
124-B Aspen Dr
Sparwood BC V0B 2G0

Date Received: 28-FEB-18
Report Date: 08-MAR-18 11:12 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2061825

Project P.O. #: NOT SUBMITTED
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 03-01_2018-02-20
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061825-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	12:35				
	Client ID	RG_DW-03-01_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	787				
	Hardness (as CaCO3) (mg/L)	451				
	pH (pH)	8.05				
	ORP (mV)	318				
	Total Suspended Solids (mg/L)	1.9				
	Total Dissolved Solids (mg/L)	500				
	Turbidity (NTU)	1.71				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	7.1				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	344				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	344				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.25 DLDS				
	Chloride (Cl) (mg/L)	36.5				
	Fluoride (F) (mg/L)	0.17				
	Nitrate (as N) (mg/L)	0.053				
	Nitrite (as N) (mg/L)	<0.0050 DLDS				
	Total Kjeldahl Nitrogen (mg/L)	<0.050				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	65.4				
	Anion Sum (meq/L)	9.28				
	Cation Sum (meq/L)	9.74				
	Cation - Anion Balance (%)	2.4				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.03				
	Total Organic Carbon (mg/L)	0.94				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00016				
	Barium (Ba)-Total (mg/L)	0.134				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.037				
	Cadmium (Cd)-Total (ug/L)	0.0945				
	Calcium (Ca)-Total (mg/L)	103				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061825-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	12:35				
	Client ID	RG_DW-03-01_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00011				
	Cobalt (Co)-Total (ug/L)	0.14				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	0.361				
	Lead (Pb)-Total (mg/L)	0.000050				
	Lithium (Li)-Total (mg/L)	0.0200				
	Magnesium (Mg)-Total (mg/L)	33.4				
	Manganese (Mn)-Total (mg/L)	0.172				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00285				
	Nickel (Ni)-Total (mg/L)	0.00289				
	Potassium (K)-Total (mg/L)	2.02				
	Selenium (Se)-Total (ug/L)	0.209				
	Silicon (Si)-Total (mg/L)	4.89				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	14.7				
	Strontium (Sr)-Total (mg/L)	0.420				
	Thallium (Tl)-Total (mg/L)	0.000106				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00102				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.138				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.036				
	Cadmium (Cd)-Dissolved (ug/L)	0.0795				
	Calcium (Ca)-Dissolved (mg/L)	122				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (ug/L)	0.12				
	Copper (Cu)-Dissolved (mg/L)	<0.00050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061825-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	12:35				
	Client ID	RG_DW-03-01_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	0.087				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0216				
	Magnesium (Mg)-Dissolved (mg/L)	35.4				
	Manganese (Mn)-Dissolved (mg/L)	0.170				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00266				
	Nickel (Ni)-Dissolved (mg/L)	0.00252				
	Potassium (K)-Dissolved (mg/L)	2.05				
	Selenium (Se)-Dissolved (ug/L)	0.190				
	Silicon (Si)-Dissolved (mg/L)	4.82				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	15.1				
	Strontium (Sr)-Dissolved (mg/L)	0.413				
	Thallium (Tl)-Dissolved (mg/L)	0.000104				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.000801				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	<0.0030				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Aluminum (Al)-Dissolved	MB-LOR	L2061825-1
Method Blank	Chromium (Cr)-Dissolved	MB-LOR	L2061825-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2061825-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2061825-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2061825-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2061825-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2061825-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2061825-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2061825-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2061825-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2061825-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2061825-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2061825-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

Reference Information

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

03-01_2018-02-20

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
124-B Aspen Dr
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R3975673								
WG2725244-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			109.0		%		85-115	02-MAR-18
WG2725244-1 MB								
Acidity (as CaCO3)			1.5		mg/L		2	02-MAR-18
ALK-TITR-VA	**Water**							
Batch R3977070								
WG2725094-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			100.9		%		85-115	02-MAR-18
WG2725094-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	02-MAR-18
BE-D-L-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Beryllium (Be)-Dissolved			96.5		%		80-120	06-MAR-18
WG2726029-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	06-MAR-18
WG2726029-4 MS		**L2061825-1**						
Beryllium (Be)-Dissolved			98.1		%		70-130	06-MAR-18
BE-T-L-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Beryllium (Be)-Total			99.2		%		80-120	04-MAR-18
WG2726127-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	04-MAR-18
BR-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Bromide (Br)			98.4		%		85-115	02-MAR-18
WG2725240-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	02-MAR-18
CARBONS-DOC-VA	**Water**							
Batch R3975791								
WG2725266-4 LCS								
Dissolved Organic Carbon			98.5		%		80-120	02-MAR-18
WG2725266-8 LCS								
Dissolved Organic Carbon			98.2		%		80-120	02-MAR-18
WG2725266-3 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R3975791								
WG2725266-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
WG2725266-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
CARBONS-TOC-VA	**Water**							
Batch R3976547								
WG2726369-1 LCS								
Total Organic Carbon			94.4		%		80-120	04-MAR-18
WG2726369-5 LCS								
Total Organic Carbon			90.6		%		80-120	04-MAR-18
WG2726369-9 LCS								
Total Organic Carbon			100.7		%		80-120	04-MAR-18
WG2726369-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-MAR-18
WG2726369-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-MAR-18
CL-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Chloride (Cl)			99.7		%		90-110	02-MAR-18
WG2725240-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	02-MAR-18
EC-PCT-VA	**Water**							
Batch R3977070								
WG2725094-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			93.9		%		90-110	02-MAR-18
WG2725094-1 MB								
Conductivity			<2.0		uS/cm		2	02-MAR-18
F-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Fluoride (F)			98.7		%		90-110	02-MAR-18
WG2725240-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	02-MAR-18
HG-D-CVAA-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R3974546								
WG2725387-2 LCS								
Mercury (Hg)-Dissolved			100.7		%		80-120	02-MAR-18
WG2725387-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	02-MAR-18
HG-T-CVAA-VA	**Water**							
Batch R3975895								
WG2726229-2 LCS								
Mercury (Hg)-Total			103.8		%		80-120	03-MAR-18
WG2726229-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	03-MAR-18
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Aluminum (Al)-Dissolved			103.7		%		80-120	06-MAR-18
Antimony (Sb)-Dissolved			94.4		%		80-120	06-MAR-18
Arsenic (As)-Dissolved			104.2		%		80-120	06-MAR-18
Barium (Ba)-Dissolved			103.9		%		80-120	06-MAR-18
Bismuth (Bi)-Dissolved			94.5		%		80-120	06-MAR-18
Boron (B)-Dissolved			93.6		%		80-120	06-MAR-18
Cadmium (Cd)-Dissolved			101.7		%		80-120	06-MAR-18
Calcium (Ca)-Dissolved			101.7		%		80-120	06-MAR-18
Chromium (Cr)-Dissolved			104.1		%		80-120	06-MAR-18
Cobalt (Co)-Dissolved			103.2		%		80-120	06-MAR-18
Copper (Cu)-Dissolved			103.8		%		80-120	06-MAR-18
Iron (Fe)-Dissolved			100.6		%		80-120	06-MAR-18
Lead (Pb)-Dissolved			96.3		%		80-120	06-MAR-18
Lithium (Li)-Dissolved			96.9		%		80-120	06-MAR-18
Magnesium (Mg)-Dissolved			100.6		%		80-120	06-MAR-18
Manganese (Mn)-Dissolved			105.3		%		80-120	06-MAR-18
Molybdenum (Mo)-Dissolved			102.4		%		80-120	06-MAR-18
Nickel (Ni)-Dissolved			100.8		%		80-120	06-MAR-18
Potassium (K)-Dissolved			99.7		%		80-120	06-MAR-18
Selenium (Se)-Dissolved			98.9		%		80-120	06-MAR-18
Silicon (Si)-Dissolved			102.1		%		80-120	06-MAR-18
Silver (Ag)-Dissolved			95.5		%		80-120	06-MAR-18
Sodium (Na)-Dissolved			106.7		%		80-120	06-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Strontium (Sr)-Dissolved			98.3		%		80-120	06-MAR-18
Thallium (Tl)-Dissolved			97.3		%		80-120	06-MAR-18
Tin (Sn)-Dissolved			99.3		%		80-120	06-MAR-18
Titanium (Ti)-Dissolved			98.9		%		80-120	06-MAR-18
Uranium (U)-Dissolved			100.7		%		80-120	06-MAR-18
Vanadium (V)-Dissolved			105.1		%		80-120	06-MAR-18
Zinc (Zn)-Dissolved			98.3		%		80-120	06-MAR-18
WG2726029-1 MB		**NP**						
Aluminum (Al)-Dissolved			0.0016	MB-LOR	mg/L		0.001	06-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	06-MAR-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	06-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Chromium (Cr)-Dissolved			0.00012	MB-LOR	mg/L		0.0001	06-MAR-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	06-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	06-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	06-MAR-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	06-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	06-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	06-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-1 MB		**NP**						
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	06-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	06-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	06-MAR-18
WG2726029-4 MS		**L2061825-1**						
Aluminum (Al)-Dissolved			99.1		%		70-130	06-MAR-18
Antimony (Sb)-Dissolved			96.1		%		70-130	06-MAR-18
Arsenic (As)-Dissolved			105.8		%		70-130	06-MAR-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	06-MAR-18
Bismuth (Bi)-Dissolved			70.4		%		70-130	06-MAR-18
Boron (B)-Dissolved			95.6		%		70-130	06-MAR-18
Cadmium (Cd)-Dissolved			105.0		%		70-130	06-MAR-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	06-MAR-18
Chromium (Cr)-Dissolved			98.1		%		70-130	06-MAR-18
Cobalt (Co)-Dissolved			96.7		%		70-130	06-MAR-18
Copper (Cu)-Dissolved			94.3		%		70-130	06-MAR-18
Iron (Fe)-Dissolved			96.2		%		70-130	06-MAR-18
Lead (Pb)-Dissolved			94.8		%		70-130	06-MAR-18
Lithium (Li)-Dissolved			95.2		%		70-130	06-MAR-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	06-MAR-18
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	06-MAR-18
Molybdenum (Mo)-Dissolved			96.3		%		70-130	06-MAR-18
Nickel (Ni)-Dissolved			93.3		%		70-130	06-MAR-18
Potassium (K)-Dissolved			96.7		%		70-130	06-MAR-18
Selenium (Se)-Dissolved			107.7		%		70-130	06-MAR-18
Silicon (Si)-Dissolved			84.7		%		70-130	06-MAR-18
Silver (Ag)-Dissolved			99.1		%		70-130	06-MAR-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	06-MAR-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	06-MAR-18
Thallium (Tl)-Dissolved			98.7		%		70-130	06-MAR-18
Tin (Sn)-Dissolved			99.1		%		70-130	06-MAR-18
Titanium (Ti)-Dissolved			95.0		%		70-130	06-MAR-18
Uranium (U)-Dissolved			109.5		%		70-130	06-MAR-18
Vanadium (V)-Dissolved			101.9		%		70-130	06-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-4 MS		**L2061825-1**						
Zinc (Zn)-Dissolved			96.1		%		70-130	06-MAR-18
MET-T-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Aluminum (Al)-Total			105.7		%		80-120	04-MAR-18
Antimony (Sb)-Total			115.4		%		80-120	04-MAR-18
Arsenic (As)-Total			104.1		%		80-120	04-MAR-18
Barium (Ba)-Total			106.3		%		80-120	04-MAR-18
Bismuth (Bi)-Total			100.5		%		80-120	04-MAR-18
Boron (B)-Total			100.1		%		80-120	04-MAR-18
Cadmium (Cd)-Total			102.3		%		80-120	04-MAR-18
Calcium (Ca)-Total			95.1		%		80-120	04-MAR-18
Chromium (Cr)-Total			101.9		%		80-120	04-MAR-18
Cobalt (Co)-Total			101.9		%		80-120	04-MAR-18
Copper (Cu)-Total			102.7		%		80-120	04-MAR-18
Iron (Fe)-Total			115.5		%		80-120	04-MAR-18
Lead (Pb)-Total			98.8		%		80-120	04-MAR-18
Lithium (Li)-Total			96.9		%		80-120	04-MAR-18
Magnesium (Mg)-Total			108.2		%		80-120	04-MAR-18
Manganese (Mn)-Total			102.6		%		80-120	04-MAR-18
Molybdenum (Mo)-Total			107.0		%		80-120	04-MAR-18
Nickel (Ni)-Total			102.3		%		80-120	04-MAR-18
Potassium (K)-Total			110.1		%		80-120	04-MAR-18
Selenium (Se)-Total			101.3		%		80-120	04-MAR-18
Silicon (Si)-Total			107.6		%		80-120	04-MAR-18
Silver (Ag)-Total			100.7		%		80-120	04-MAR-18
Sodium (Na)-Total			109.2		%		80-120	04-MAR-18
Strontium (Sr)-Total			104.5		%		80-120	04-MAR-18
Thallium (Tl)-Total			101.2		%		80-120	04-MAR-18
Tin (Sn)-Total			102.9		%		80-120	04-MAR-18
Titanium (Ti)-Total			97.5		%		80-120	04-MAR-18
Uranium (U)-Total			101.0		%		80-120	04-MAR-18
Vanadium (V)-Total			102.5		%		80-120	04-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Zinc (Zn)-Total			99.5		%		80-120	04-MAR-18
WG2726127-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	04-MAR-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Boron (B)-Total			<0.010		mg/L		0.01	04-MAR-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	04-MAR-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	04-MAR-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Iron (Fe)-Total			<0.010		mg/L		0.01	04-MAR-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	04-MAR-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	04-MAR-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Potassium (K)-Total			<0.050		mg/L		0.05	04-MAR-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Silicon (Si)-Total			<0.10		mg/L		0.1	04-MAR-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Sodium (Na)-Total			<0.050		mg/L		0.05	04-MAR-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	04-MAR-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	04-MAR-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	04-MAR-18
NH3-F-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Water**							
Batch R3978750								
WG2727367-6 LCS								
Ammonia, Total (as N)			96.0		%		85-115	07-MAR-18
WG2727367-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	07-MAR-18
NO2-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Nitrite (as N)			98.1		%		90-110	02-MAR-18
WG2725240-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	02-MAR-18
NO3-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Nitrate (as N)			100.6		%		90-110	02-MAR-18
WG2725240-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	02-MAR-18
ORP-VA	**Water**							
Batch R3973414								
WG2725161-1 CRM		**VA-ORP**						
ORP			220		mV		210-230	01-MAR-18
P-T-PRES-COL-VA	**Water**							
Batch R3974648								
WG2725372-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			106.2		%		80-120	02-MAR-18
WG2725372-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	02-MAR-18
PH-PCT-VA	**Water**							
Batch R3977070								
WG2725094-2 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	02-MAR-18
PO4-DO-COL-VA	**Water**							
Batch R3973682								
WG2725271-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			101.9		%		80-120	02-MAR-18
WG2725271-14 CRM		**VA-OPO4-CONTROL**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-COL-VA	**Water**							
Batch R3973682								
WG2725271-14 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.2		%		80-120	02-MAR-18
WG2725271-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.7		%		80-120	02-MAR-18
WG2725271-6 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			92.1		%		80-120	02-MAR-18
WG2725271-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
SO4-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Sulfate (SO4)			100.8		%		90-110	02-MAR-18
WG2725240-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	02-MAR-18
TDS-LOW-VA	**Water**							
Batch R3975822								
WG2725258-2 LCS								
Total Dissolved Solids			101.0		%		85-115	02-MAR-18
WG2725258-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	02-MAR-18
TKN-F-VA	**Water**							
Batch R3976068								
WG2725895-2 LCS								
Total Kjeldahl Nitrogen			100.2		%		75-125	04-MAR-18
WG2725895-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	04-MAR-18
TSS-LOW-VA	**Water**							
Batch R3975820								
WG2725251-2 LCS								
Total Suspended Solids			95.3		%		85-115	02-MAR-18
WG2725251-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-LOW-VA	**Water**							
Batch R3975820								
WG2725251-1 MB								
Total Suspended Solids			<1.0		mg/L		1	02-MAR-18
TURBIDITY-VA	**Water**							
Batch R3973442								
WG2725218-2 CRM		**VA-FORM-40**						
Turbidity			101.5		%		85-115	01-MAR-18
WG2725218-1 MB								
Turbidity			<0.10		NTU		0.1	01-MAR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	26-FEB-18 12:35	01-MAR-18 20:00	0.25	79	hours	EHTR-FM
pH by Meter (Automated)							
	1	26-FEB-18 12:35	02-MAR-18 11:50	0.25	95	hours	EHTR-FM
Anions and Nutrients							
Diss. Orthophosphate in Water by Colour							
	1	26-FEB-18 12:35	02-MAR-18 01:13	3	4	days	EHT
Nitrate in Water by IC (Low Level)							
	1	26-FEB-18 12:35	02-MAR-18 07:02	3	4	days	EHT
Nitrite in Water by IC (Low Level)							
	1	26-FEB-18 12:35	02-MAR-18 07:02	3	4	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2061825 were received on 28-FEB-18 10:20.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	03-01_2018-02-20	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program
Project Manager	Lee Wilm
Email	lee.wilm@teck.com
Address	PO Box 1777, 124B Aspen Drive
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-865-5289

LABORATORY

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Lab Contact	Can Dang
Email	can.dang@alsglobal.com
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OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	lee.wilm@teck.com	X	X	X
Email 2:	carla.fraser@teck.com	X	X	X
Email 3:	andrew.wight@teck.com	X	X	X
Email 4:	teckcoal@equisonline.com			X
Email 5:				
PO number				

SAMPLE DETAILS / **ANALYSIS REQUESTED**

L2061825-COFC

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA
Filtered								F	N	F	N	F	N	N
Preservative								H2SO4	H2SO4	HCL	HCL	HNO3	HNO3	
RG_DW-03-01_WP_Q1-2018_NP	RG_DW-03-01	WP		~~20~~ 16-Feb-18	1235	G	7	1	1	1	1	1	1	1

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
A. Wight	20 Feb 2018 14:45	JC 6°C	FEB 28 2018 10:20AM

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	A.Wight	Mobile #	250-433-1159
Sampler's Signature	A. Wight	Date/Time	February ~~20~~ 16, 2018

Teck Coal Ltd.
ATTN: Lee Wilm
124-B Aspen Dr
Sparwood BC V0B 2G0

Date Received: 28-FEB-18
Report Date: 08-MAR-18 11:10 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2061826

Project P.O. #: NOT SUBMITTED
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 03-04_2018-02-20
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061826-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	14:20				
	Client ID	RG_DW-03-04_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	552				
	Hardness (as CaCO3) (mg/L)	306				
	pH (pH)	8.11				
	ORP (mV)	309				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	373				
	Turbidity (NTU)	0.32				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	2.1				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	174				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	174				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	8.38				
	Fluoride (F) (mg/L)	0.155				
	Nitrate (as N) (mg/L)	2.31				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.179 TKNI				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0027				
	Phosphorus (P)-Total (mg/L)	0.0028				
	Sulfate (SO4) (mg/L)	114				
	Anion Sum (meq/L)	6.26				
	Cation Sum (meq/L)	6.42				
	Cation - Anion Balance (%)	1.3				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.66				
	Total Organic Carbon (mg/L)	0.79				
Total Metals	Aluminum (Al)-Total (mg/L)	0.0083				
	Antimony (Sb)-Total (mg/L)	0.00014				
	Arsenic (As)-Total (mg/L)	0.00014				
	Barium (Ba)-Total (mg/L)	0.175				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.011				
	Cadmium (Cd)-Total (ug/L)	0.0235				
	Calcium (Ca)-Total (mg/L)	73.4				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061826-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	14:20				
	Client ID	RG_DW-03-04_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00028				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.0105				
	Iron (Fe)-Total (mg/L)	0.015				
	Lead (Pb)-Total (mg/L)	0.000348				
	Lithium (Li)-Total (mg/L)	0.0091				
	Magnesium (Mg)-Total (mg/L)	23.4				
	Manganese (Mn)-Total (mg/L)	0.00057				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00112				
	Nickel (Ni)-Total (mg/L)	0.0158				
	Potassium (K)-Total (mg/L)	0.994				
	Selenium (Se)-Total (ug/L)	13.1				
	Silicon (Si)-Total (mg/L)	2.66				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	6.64				
	Strontium (Sr)-Total (mg/L)	0.186				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	0.00023				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00101				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0397				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	0.00011				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.180				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.010				
	Cadmium (Cd)-Dissolved (ug/L)	0.0152				
	Calcium (Ca)-Dissolved (mg/L)	82.2				
	Chromium (Cr)-Dissolved (mg/L)	<0.00030 DLB				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	<0.00050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2061826-1				
	Description	WP				
	Sampled Date	26-FEB-18				
	Sampled Time	14:20				
	Client ID	RG_DW-03-04_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0092				
	Magnesium (Mg)-Dissolved (mg/L)	24.4				
	Manganese (Mn)-Dissolved (mg/L)	0.00029				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000932				
	Nickel (Ni)-Dissolved (mg/L)	0.00077				
	Potassium (K)-Dissolved (mg/L)	0.978				
	Selenium (Se)-Dissolved (ug/L)	13.5				
	Silicon (Si)-Dissolved (mg/L)	2.65				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	6.55				
	Strontium (Sr)-Dissolved (mg/L)	0.179				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.000941				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0047				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Aluminum (Al)-Dissolved	MB-LOR	L2061826-1
Method Blank	Chromium (Cr)-Dissolved	MB-LOR	L2061826-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2061826-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2061826-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2061826-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2061826-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2061826-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2061826-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2061826-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2061826-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2061826-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2061826-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2061826-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

Reference Information

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

03-04_2018-02-20

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
124-B Aspen Dr
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R3975673								
WG2725244-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			109.0		%		85-115	02-MAR-18
WG2725244-1 MB								
Acidity (as CaCO3)			1.5		mg/L		2	02-MAR-18
ALK-TITR-VA	**Water**							
Batch R3977070								
WG2725094-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			100.9		%		85-115	02-MAR-18
WG2725094-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	02-MAR-18
BE-D-L-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Beryllium (Be)-Dissolved			96.5		%		80-120	06-MAR-18
WG2726029-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	06-MAR-18
BE-T-L-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Beryllium (Be)-Total			99.2		%		80-120	04-MAR-18
WG2726127-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	04-MAR-18
BR-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Bromide (Br)			98.4		%		85-115	02-MAR-18
WG2725240-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	02-MAR-18
CARBONS-DOC-VA	**Water**							
Batch R3975791								
WG2725266-1 DUP		**L2061826-1**						
Dissolved Organic Carbon		0.66	0.82	J	mg/L	0.17	1	02-MAR-18
WG2725266-4 LCS								
Dissolved Organic Carbon			98.5		%		80-120	02-MAR-18
WG2725266-8 LCS								
Dissolved Organic Carbon			98.2		%		80-120	02-MAR-18
WG2725266-3 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R3975791								
WG2725266-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
WG2725266-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
CARBONS-TOC-VA	**Water**							
Batch R3975788								
WG2725265-2 DUP		**L2061826-1**						
Total Organic Carbon		0.79	0.68		mg/L	14	20	02-MAR-18
WG2725265-1 LCS								
Total Organic Carbon			96.3		%		80-120	02-MAR-18
WG2725265-5 LCS								
Total Organic Carbon			100.2		%		80-120	02-MAR-18
WG2725265-9 LCS								
Total Organic Carbon			95.7		%		80-120	02-MAR-18
WG2725265-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
WG2725265-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-MAR-18
CL-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Chloride (Cl)			99.7		%		90-110	02-MAR-18
WG2725240-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	02-MAR-18
EC-PCT-VA	**Water**							
Batch R3977070								
WG2725094-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			93.9		%		90-110	02-MAR-18
WG2725094-1 MB								
Conductivity			<2.0		uS/cm		2	02-MAR-18
F-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Fluoride (F)			98.7		%		90-110	02-MAR-18
WG2725240-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	02-MAR-18
HG-D-CVAA-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R3974546								
WG2725387-2 LCS								
Mercury (Hg)-Dissolved			100.7		%		80-120	02-MAR-18
WG2725387-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	02-MAR-18
HG-T-CVAA-VA	**Water**							
Batch R3975895								
WG2726229-2 LCS								
Mercury (Hg)-Total			103.8		%		80-120	03-MAR-18
WG2726229-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	03-MAR-18
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Aluminum (Al)-Dissolved			103.7		%		80-120	06-MAR-18
Antimony (Sb)-Dissolved			94.4		%		80-120	06-MAR-18
Arsenic (As)-Dissolved			104.2		%		80-120	06-MAR-18
Barium (Ba)-Dissolved			103.9		%		80-120	06-MAR-18
Bismuth (Bi)-Dissolved			94.5		%		80-120	06-MAR-18
Boron (B)-Dissolved			93.6		%		80-120	06-MAR-18
Cadmium (Cd)-Dissolved			101.7		%		80-120	06-MAR-18
Calcium (Ca)-Dissolved			101.7		%		80-120	06-MAR-18
Chromium (Cr)-Dissolved			104.1		%		80-120	06-MAR-18
Cobalt (Co)-Dissolved			103.2		%		80-120	06-MAR-18
Copper (Cu)-Dissolved			103.8		%		80-120	06-MAR-18
Iron (Fe)-Dissolved			100.6		%		80-120	06-MAR-18
Lead (Pb)-Dissolved			96.3		%		80-120	06-MAR-18
Lithium (Li)-Dissolved			96.9		%		80-120	06-MAR-18
Magnesium (Mg)-Dissolved			100.6		%		80-120	06-MAR-18
Manganese (Mn)-Dissolved			105.3		%		80-120	06-MAR-18
Molybdenum (Mo)-Dissolved			102.4		%		80-120	06-MAR-18
Nickel (Ni)-Dissolved			100.8		%		80-120	06-MAR-18
Potassium (K)-Dissolved			99.7		%		80-120	06-MAR-18
Selenium (Se)-Dissolved			98.9		%		80-120	06-MAR-18
Silicon (Si)-Dissolved			102.1		%		80-120	06-MAR-18
Silver (Ag)-Dissolved			95.5		%		80-120	06-MAR-18
Sodium (Na)-Dissolved			106.7		%		80-120	06-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-2 LCS								
Strontium (Sr)-Dissolved			98.3		%		80-120	06-MAR-18
Thallium (Tl)-Dissolved			97.3		%		80-120	06-MAR-18
Tin (Sn)-Dissolved			99.3		%		80-120	06-MAR-18
Titanium (Ti)-Dissolved			98.9		%		80-120	06-MAR-18
Uranium (U)-Dissolved			100.7		%		80-120	06-MAR-18
Vanadium (V)-Dissolved			105.1		%		80-120	06-MAR-18
Zinc (Zn)-Dissolved			98.3		%		80-120	06-MAR-18
WG2726029-1 MB		**NP**						
Aluminum (Al)-Dissolved			0.0016	MB-LOR	mg/L		0.001	06-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	06-MAR-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	06-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Chromium (Cr)-Dissolved			0.00012	MB-LOR	mg/L		0.0001	06-MAR-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	06-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	06-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	06-MAR-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	06-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	06-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	06-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	06-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	06-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	06-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3978081								
WG2726029-1 MB		**NP**						
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	06-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	06-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	06-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	06-MAR-18
MET-T-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Aluminum (Al)-Total			105.7		%		80-120	04-MAR-18
Antimony (Sb)-Total			115.4		%		80-120	04-MAR-18
Arsenic (As)-Total			104.1		%		80-120	04-MAR-18
Barium (Ba)-Total			106.3		%		80-120	04-MAR-18
Bismuth (Bi)-Total			100.5		%		80-120	04-MAR-18
Boron (B)-Total			100.1		%		80-120	04-MAR-18
Cadmium (Cd)-Total			102.3		%		80-120	04-MAR-18
Calcium (Ca)-Total			95.1		%		80-120	04-MAR-18
Chromium (Cr)-Total			101.9		%		80-120	04-MAR-18
Cobalt (Co)-Total			101.9		%		80-120	04-MAR-18
Copper (Cu)-Total			102.7		%		80-120	04-MAR-18
Iron (Fe)-Total			115.5		%		80-120	04-MAR-18
Lead (Pb)-Total			98.8		%		80-120	04-MAR-18
Lithium (Li)-Total			96.9		%		80-120	04-MAR-18
Magnesium (Mg)-Total			108.2		%		80-120	04-MAR-18
Manganese (Mn)-Total			102.6		%		80-120	04-MAR-18
Molybdenum (Mo)-Total			107.0		%		80-120	04-MAR-18
Nickel (Ni)-Total			102.3		%		80-120	04-MAR-18
Potassium (K)-Total			110.1		%		80-120	04-MAR-18
Selenium (Se)-Total			101.3		%		80-120	04-MAR-18
Silicon (Si)-Total			107.6		%		80-120	04-MAR-18
Silver (Ag)-Total			100.7		%		80-120	04-MAR-18
Sodium (Na)-Total			109.2		%		80-120	04-MAR-18
Strontium (Sr)-Total			104.5		%		80-120	04-MAR-18
Thallium (Tl)-Total			101.2		%		80-120	04-MAR-18
Tin (Sn)-Total			102.9		%		80-120	04-MAR-18
Titanium (Ti)-Total			97.5		%		80-120	04-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3978030								
WG2726127-2 LCS								
Uranium (U)-Total			101.0		%		80-120	04-MAR-18
Vanadium (V)-Total			102.5		%		80-120	04-MAR-18
Zinc (Zn)-Total			99.5		%		80-120	04-MAR-18
WG2726127-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	04-MAR-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Boron (B)-Total			<0.010		mg/L		0.01	04-MAR-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	04-MAR-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	04-MAR-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Iron (Fe)-Total			<0.010		mg/L		0.01	04-MAR-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	04-MAR-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	04-MAR-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Potassium (K)-Total			<0.050		mg/L		0.05	04-MAR-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	04-MAR-18
Silicon (Si)-Total			<0.10		mg/L		0.1	04-MAR-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Sodium (Na)-Total			<0.050		mg/L		0.05	04-MAR-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	04-MAR-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	04-MAR-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	04-MAR-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	04-MAR-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	04-MAR-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	04-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Water**							
Batch R3978750								
WG2727367-6 LCS								
Ammonia, Total (as N)			96.0		%		85-115	07-MAR-18
WG2727367-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	07-MAR-18
NO2-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Nitrite (as N)			98.1		%		90-110	02-MAR-18
WG2725240-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	02-MAR-18
NO3-L-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Nitrate (as N)			100.6		%		90-110	02-MAR-18
WG2725240-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	02-MAR-18
ORP-VA	**Water**							
Batch R3973414								
WG2725161-1 CRM		**VA-ORP**						
ORP			220		mV		210-230	01-MAR-18
P-T-PRES-COL-VA	**Water**							
Batch R3974648								
WG2725372-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			106.2		%		80-120	02-MAR-18
WG2725372-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	02-MAR-18
PH-PCT-VA	**Water**							
Batch R3977070								
WG2725094-2 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	02-MAR-18
PO4-DO-COL-VA	**Water**							
Batch R3973682								
WG2725271-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			101.9		%		80-120	02-MAR-18
WG2725271-14 CRM		**VA-OPO4-CONTROL**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-COL-VA	**Water**							
Batch R3973682								
WG2725271-14 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.2		%		80-120	02-MAR-18
WG2725271-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.7		%		80-120	02-MAR-18
WG2725271-6 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			92.1		%		80-120	02-MAR-18
WG2725271-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
WG2725271-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAR-18
SO4-IC-N-VA	**Water**							
Batch R3975927								
WG2725240-2 LCS								
Sulfate (SO4)			100.8		%		90-110	02-MAR-18
WG2725240-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	02-MAR-18
TDS-LOW-VA	**Water**							
Batch R3975822								
WG2725258-2 LCS								
Total Dissolved Solids			101.0		%		85-115	02-MAR-18
WG2725258-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	02-MAR-18
TKN-F-VA	**Water**							
Batch R3976068								
WG2725895-2 LCS								
Total Kjeldahl Nitrogen			100.2		%		75-125	04-MAR-18
WG2725895-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	04-MAR-18
TSS-LOW-VA	**Water**							
Batch R3975820								
WG2725251-2 LCS								
Total Suspended Solids			95.3		%		85-115	02-MAR-18
WG2725251-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-LOW-VA	**Water**							
Batch R3975820								
WG2725251-1 MB								
Total Suspended Solids			<1.0		mg/L		1	02-MAR-18
TURBIDITY-VA	**Water**							
Batch R3973442								
WG2725218-2 CRM		**VA-FORM-40**						
Turbidity			101.5		%		85-115	01-MAR-18
WG2725218-1 MB								
Turbidity			<0.10		NTU		0.1	01-MAR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	26-FEB-18 14:20	01-MAR-18 20:00	0.25	78	hours	EHTR-FM
pH by Meter (Automated)							
	1	26-FEB-18 14:20	02-MAR-18 11:50	0.25	94	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	26-FEB-18 14:20	02-MAR-18 07:02	3	4	days	EHT
Nitrite in Water by IC (Low Level)							
	1	26-FEB-18 14:20	02-MAR-18 07:02	3	4	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2061826 were received on 28-FEB-18 10:20.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	03-04_2018-02-20	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program
Project Manager	Lee Wilm
Email	lee.wilm@teck.com
Address	PO Box 1777, 124B Aspen Drive
City	Sparwood
Province	BC
Postal Code	V0B 2G0
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Phone Number	250-865-5289

LABORATORY

Lab Name	ALS Burnaby
Lab Contact	Can Dang
Email	can.dang@alsglobal.com
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City	Burnaby
Province	BC
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OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	lee.wilm@teck.com	X	X	X
Email 2:	carla.fraser@teck.com	X	X	X
Email 3:	andrew.wight@teck.com	X	X	X
Email 4:	teckcoal@equisonline.com			X
Email 5:				
PO number				

SAMPLE DETAILS / **ANALYSIS REQUESTED**

L2061826-COFC

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC (F, H2SO4)	ALS_Package-TKN/TOC (N, H2SO4)	HG-D-CVAF-VA (F, HCL)	HG-T-CVAF-VA (N, HCL)	TECKCOAL-MET-D-VA (F, HNO3)	TECKCOAL-MET-T-VA (N, HNO3)	TECKCOAL-ROUTINE-VA (N)
RG_DW-03-04_WP_Q1-2018_NP	RG_DW-03-04	WP	N	26-Feb-18	14:20	G	7	1	1	1	1	1	1	1

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
A.WIGHT	20 Feb 2018 14:45	JC 6°C	FEB 28 2018 10:20

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	A.Wight	Mobile #	250-433-1159
Sampler's Signature	A. Wight	Date/Time	February 26, 2018

Teck Coal Ltd.
ATTN: Lee Wilm
124-B Aspen Dr
Sparwood BC V0B 2G0

Date Received: 15-FEB-18
Report Date: 21-FEB-18 16:50 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2057118

Project P.O. #: VPO 489057
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 07-01_2018-02-13
Legal Site Desc:

Other Information: INV COMMENTS: RG-DW-07-01

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2057118-1				
	Description	WP				
	Sampled Date	13-FEB-18				
	Sampled Time	14:02				
	Client ID	RG_DW-07-01_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	1510				
	Hardness (as CaCO3) (mg/L)	889				
	pH (pH)	7.75				
	ORP (mV)	322				
	Total Suspended Solids (mg/L)	1.3				
	Total Dissolved Solids (mg/L)	1200				
	Turbidity (NTU)	1.07				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	15.5				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	295				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	295				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.25 DLDS				
	Chloride (Cl) (mg/L)	9.40				
	Fluoride (F) (mg/L)	0.16				
	Nitrate (as N) (mg/L)	3.07				
	Nitrite (as N) (mg/L)	<0.0050 DLDS				
	Total Kjeldahl Nitrogen (mg/L)	0.249 TKNI				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	0.0021				
	Sulfate (SO4) (mg/L)	602				
	Anion Sum (meq/L)	18.9				
	Cation Sum (meq/L)	19.4				
	Cation - Anion Balance (%)	1.3				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.29				
	Total Organic Carbon (mg/L)	1.20				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	0.00024				
	Arsenic (As)-Total (mg/L)	0.00016				
	Barium (Ba)-Total (mg/L)	0.0950				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.042				
	Cadmium (Cd)-Total (ug/L)	0.0446				
	Calcium (Ca)-Total (mg/L)	199				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2057118-1				
	Description	WP				
	Sampled Date	13-FEB-18				
	Sampled Time	14:02				
	Client ID	RG_DW-07-01_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00019				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.00838				
	Iron (Fe)-Total (mg/L)	0.076				
	Lead (Pb)-Total (mg/L)	0.000157				
	Lithium (Li)-Total (mg/L)	0.0202				
	Magnesium (Mg)-Total (mg/L)	89.2				
	Manganese (Mn)-Total (mg/L)	0.00091				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00101				
	Nickel (Ni)-Total (mg/L)	0.00087				
	Potassium (K)-Total (mg/L)	2.15				
	Selenium (Se)-Total (ug/L)	8.95				
	Silicon (Si)-Total (mg/L)	3.04				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	36.9				
	Strontium (Sr)-Total (mg/L)	0.602				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00454				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0220				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	0.00024				
	Arsenic (As)-Dissolved (mg/L)	0.00011				
	Barium (Ba)-Dissolved (mg/L)	0.0953				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.044				
	Cadmium (Cd)-Dissolved (ug/L)	0.0358				
	Calcium (Ca)-Dissolved (mg/L)	224				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00713				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2057118-1				
	Description	WP				
	Sampled Date	13-FEB-18				
	Sampled Time	14:02				
	Client ID	RG_DW-07-01_WP_Q1-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	0.000092				
	Lithium (Li)-Dissolved (mg/L)	0.0216				
	Magnesium (Mg)-Dissolved (mg/L)	80.1				
	Manganese (Mn)-Dissolved (mg/L)	0.00025				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000952				
	Nickel (Ni)-Dissolved (mg/L)	0.00084				
	Potassium (K)-Dissolved (mg/L)	2.21				
	Selenium (Se)-Dissolved (ug/L)	9.18				
	Silicon (Si)-Dissolved (mg/L)	2.74				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	36.6				
	Strontium (Sr)-Dissolved (mg/L)	0.637				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00368				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0215				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2057118-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2057118-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2057118-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2057118-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2057118-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2057118-1
Matrix Spike	Copper (Cu)-Total	MS-B	L2057118-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2057118-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2057118-1
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2057118-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Reference Information

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

07-01_2018-02-13

Additional Information:

INV COMMENTS: RG-DW-07-01

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
124-B Aspen Dr
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R3964667								
WG2717862-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			112.9		%		85-115	16-FEB-18
WG2717862-1 MB								
Acidity (as CaCO3)			1.3		mg/L		2	16-FEB-18
ALK-TITR-VA	**Water**							
Batch R3962517								
WG2717865-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			103.3		%		85-115	16-FEB-18
WG2717865-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	16-FEB-18
BE-D-L-CCMS-VA	**Water**							
Batch R3966469								
WG2718398-2 LCS								
Beryllium (Be)-Dissolved			98.3		%		80-120	18-FEB-18
WG2718398-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	18-FEB-18
WG2718398-4 MS		**L2057118-1**						
Beryllium (Be)-Dissolved			91.0		%		70-130	18-FEB-18
BE-T-L-CCMS-VA	**Water**							
Batch R3965408								
WG2718392-2 LCS								
Beryllium (Be)-Total			105.9		%		80-120	19-FEB-18
WG2718392-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	19-FEB-18
BR-L-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-2 LCS								
Bromide (Br)			97.7		%		85-115	16-FEB-18
WG2717860-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	16-FEB-18
CARBONS-DOC-VA	**Water**							
Batch R3963572								
WG2717568-12 LCS								
Dissolved Organic Carbon			94.3		%		80-120	16-FEB-18
WG2717568-4 LCS								
Dissolved Organic Carbon			94.2		%		80-120	16-FEB-18
WG2717568-8 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R3963572								
WG2717568-8 LCS								
Dissolved Organic Carbon			94.2		%		80-120	16-FEB-18
WG2717568-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
WG2717568-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
WG2717568-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
CARBONS-TOC-VA	**Water**							
Batch R3963571								
WG2717567-1 LCS								
Total Organic Carbon			95.1		%		80-120	16-FEB-18
WG2717567-13 LCS								
Total Organic Carbon			92.9		%		80-120	16-FEB-18
WG2717567-5 LCS								
Total Organic Carbon			94.1		%		80-120	16-FEB-18
WG2717567-9 LCS								
Total Organic Carbon			92.9		%		80-120	16-FEB-18
WG2717567-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
WG2717567-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
WG2717567-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	16-FEB-18
CL-L-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-2 LCS								
Chloride (Cl)			98.3		%		90-110	16-FEB-18
WG2717860-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	16-FEB-18
EC-PCT-VA	**Water**							
Batch R3964667								
WG2717862-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			99.7		%		90-110	16-FEB-18
WG2717862-1 MB								
Conductivity			<2.0		uS/cm		2	16-FEB-18
F-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-2 LCS								
Fluoride (F)			99.0		%		90-110	16-FEB-18
WG2717860-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	16-FEB-18
HG-D-CVAA-VA	**Water**							
Batch R3966424								
WG2718673-10 LCS								
Mercury (Hg)-Dissolved			99.6		%		80-120	20-FEB-18
WG2718673-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	20-FEB-18
HG-T-CVAA-VA	**Water**							
Batch R3962321								
WG2717713-2 LCS								
Mercury (Hg)-Total			100.6		%		80-120	16-FEB-18
WG2717713-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	16-FEB-18
MET-D-CCMS-VA	**Water**							
Batch R3966469								
WG2718398-2 LCS								
Aluminum (Al)-Dissolved			108.3		%		80-120	18-FEB-18
Antimony (Sb)-Dissolved			95.5		%		80-120	18-FEB-18
Arsenic (As)-Dissolved			95.4		%		80-120	18-FEB-18
Barium (Ba)-Dissolved			104.3		%		80-120	18-FEB-18
Bismuth (Bi)-Dissolved			97.5		%		80-120	18-FEB-18
Boron (B)-Dissolved			89.4		%		80-120	18-FEB-18
Cadmium (Cd)-Dissolved			101.5		%		80-120	18-FEB-18
Calcium (Ca)-Dissolved			108.0		%		80-120	18-FEB-18
Chromium (Cr)-Dissolved			102.5		%		80-120	18-FEB-18
Cobalt (Co)-Dissolved			104.6		%		80-120	18-FEB-18
Copper (Cu)-Dissolved			101.1		%		80-120	18-FEB-18
Iron (Fe)-Dissolved			108.0		%		80-120	18-FEB-18
Lead (Pb)-Dissolved			99.3		%		80-120	18-FEB-18
Lithium (Li)-Dissolved			101.8		%		80-120	18-FEB-18
Magnesium (Mg)-Dissolved			112.0		%		80-120	18-FEB-18
Manganese (Mn)-Dissolved			105.4		%		80-120	18-FEB-18
Molybdenum (Mo)-Dissolved			100.4		%		80-120	18-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3966469								
WG2718398-2 LCS								
Nickel (Ni)-Dissolved			104.9		%		80-120	18-FEB-18
Potassium (K)-Dissolved			107.7		%		80-120	18-FEB-18
Selenium (Se)-Dissolved			100.5		%		80-120	18-FEB-18
Silicon (Si)-Dissolved			99.1		%		80-120	18-FEB-18
Silver (Ag)-Dissolved			96.1		%		80-120	18-FEB-18
Strontium (Sr)-Dissolved			108.8		%		80-120	18-FEB-18
Thallium (Tl)-Dissolved			97.4		%		80-120	18-FEB-18
Tin (Sn)-Dissolved			95.3		%		80-120	18-FEB-18
Titanium (Ti)-Dissolved			94.3		%		80-120	18-FEB-18
Uranium (U)-Dissolved			100.5		%		80-120	18-FEB-18
Vanadium (V)-Dissolved			106.8		%		80-120	18-FEB-18
Zinc (Zn)-Dissolved			90.5		%		80-120	18-FEB-18
WG2718398-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	18-FEB-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	18-FEB-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	18-FEB-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	18-FEB-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	18-FEB-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	18-FEB-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	18-FEB-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	18-FEB-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	18-FEB-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	18-FEB-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	18-FEB-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	18-FEB-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	18-FEB-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	18-FEB-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	18-FEB-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	18-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3966469								
WG2718398-1 MB		**NP**						
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	18-FEB-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	18-FEB-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	18-FEB-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	18-FEB-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	18-FEB-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	18-FEB-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	18-FEB-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	18-FEB-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	18-FEB-18
WG2718398-4 MS		**L2057118-1**						
Aluminum (Al)-Dissolved			99.4		%		70-130	18-FEB-18
Antimony (Sb)-Dissolved			108.1		%		70-130	18-FEB-18
Arsenic (As)-Dissolved			105.3		%		70-130	18-FEB-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	18-FEB-18
Boron (B)-Dissolved			93.5		%		70-130	18-FEB-18
Cadmium (Cd)-Dissolved			97.9		%		70-130	18-FEB-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	18-FEB-18
Chromium (Cr)-Dissolved			94.9		%		70-130	18-FEB-18
Cobalt (Co)-Dissolved			94.5		%		70-130	18-FEB-18
Copper (Cu)-Dissolved			91.0		%		70-130	18-FEB-18
Iron (Fe)-Dissolved			95.1		%		70-130	18-FEB-18
Lead (Pb)-Dissolved			88.4		%		70-130	18-FEB-18
Lithium (Li)-Dissolved			87.7		%		70-130	18-FEB-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	18-FEB-18
Manganese (Mn)-Dissolved			98.0		%		70-130	18-FEB-18
Molybdenum (Mo)-Dissolved			100.8		%		70-130	18-FEB-18
Nickel (Ni)-Dissolved			94.4		%		70-130	18-FEB-18
Potassium (K)-Dissolved			105.4		%		70-130	18-FEB-18
Selenium (Se)-Dissolved			113.2		%		70-130	18-FEB-18
Silicon (Si)-Dissolved			90.9		%		70-130	18-FEB-18
Silver (Ag)-Dissolved			91.9		%		70-130	18-FEB-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	18-FEB-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	18-FEB-18
Thallium (Tl)-Dissolved			92.1		%		70-130	18-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3966469								
WG2718398-4 MS		**L2057118-1**						
Tin (Sn)-Dissolved			97.7		%		70-130	18-FEB-18
Titanium (Ti)-Dissolved			105.9		%		70-130	18-FEB-18
Uranium (U)-Dissolved			105.6		%		70-130	18-FEB-18
Vanadium (V)-Dissolved			102.7		%		70-130	18-FEB-18
Zinc (Zn)-Dissolved			87.7		%		70-130	18-FEB-18
Batch R3966642								
WG2718398-2 LCS								
Sodium (Na)-Dissolved			93.7		%		80-120	20-FEB-18
MET-T-CCMS-VA	**Water**							
Batch R3965408								
WG2718392-2 LCS								
Aluminum (Al)-Total			107.2		%		80-120	19-FEB-18
Antimony (Sb)-Total			99.9		%		80-120	19-FEB-18
Arsenic (As)-Total			96.6		%		80-120	19-FEB-18
Barium (Ba)-Total			100.9		%		80-120	19-FEB-18
Bismuth (Bi)-Total			100.3		%		80-120	19-FEB-18
Boron (B)-Total			90.0		%		80-120	19-FEB-18
Cadmium (Cd)-Total			103.2		%		80-120	19-FEB-18
Calcium (Ca)-Total			102.6		%		80-120	19-FEB-18
Chromium (Cr)-Total			101.0		%		80-120	19-FEB-18
Cobalt (Co)-Total			102.6		%		80-120	19-FEB-18
Copper (Cu)-Total			102.2		%		80-120	19-FEB-18
Iron (Fe)-Total			101.9		%		80-120	19-FEB-18
Lead (Pb)-Total			101.3		%		80-120	19-FEB-18
Lithium (Li)-Total			108.5		%		80-120	19-FEB-18
Magnesium (Mg)-Total			109.5		%		80-120	19-FEB-18
Manganese (Mn)-Total			101.9		%		80-120	19-FEB-18
Molybdenum (Mo)-Total			96.4		%		80-120	19-FEB-18
Nickel (Ni)-Total			103.2		%		80-120	19-FEB-18
Potassium (K)-Total			100.2		%		80-120	19-FEB-18
Selenium (Se)-Total			96.4		%		80-120	19-FEB-18
Silicon (Si)-Total			99.5		%		80-120	19-FEB-18
Silver (Ag)-Total			95.6		%		80-120	19-FEB-18
Sodium (Na)-Total			108.1		%		80-120	19-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3965408								
WG2718392-2 LCS								
Strontium (Sr)-Total			100.4		%		80-120	19-FEB-18
Thallium (Tl)-Total			102.7		%		80-120	19-FEB-18
Tin (Sn)-Total			95.7		%		80-120	19-FEB-18
Titanium (Ti)-Total			93.3		%		80-120	19-FEB-18
Uranium (U)-Total			111.2		%		80-120	19-FEB-18
Vanadium (V)-Total			103.1		%		80-120	19-FEB-18
Zinc (Zn)-Total			100.9		%		80-120	19-FEB-18
WG2718392-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	19-FEB-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	19-FEB-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	19-FEB-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	19-FEB-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	19-FEB-18
Boron (B)-Total			<0.010		mg/L		0.01	19-FEB-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	19-FEB-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	19-FEB-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	19-FEB-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	19-FEB-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	19-FEB-18
Iron (Fe)-Total			<0.010		mg/L		0.01	19-FEB-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	19-FEB-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	19-FEB-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	19-FEB-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	19-FEB-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	19-FEB-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	19-FEB-18
Potassium (K)-Total			<0.050		mg/L		0.05	19-FEB-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	19-FEB-18
Silicon (Si)-Total			<0.10		mg/L		0.1	19-FEB-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	19-FEB-18
Sodium (Na)-Total			<0.050		mg/L		0.05	19-FEB-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	19-FEB-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	19-FEB-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	19-FEB-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3965408								
WG2718392-1 MB								
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	19-FEB-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	19-FEB-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	19-FEB-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	19-FEB-18
NH3-F-VA	**Water**							
Batch R3965149								
WG2718532-6 LCS								
Ammonia, Total (as N)			98.4		%		85-115	19-FEB-18
WG2718532-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	19-FEB-18
NO2-L-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-2 LCS								
Nitrite (as N)			97.8		%		90-110	16-FEB-18
WG2717860-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	16-FEB-18
NO3-L-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-2 LCS								
Nitrate (as N)			98.6		%		90-110	16-FEB-18
WG2717860-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	16-FEB-18
ORP-VA	**Water**							
Batch R3964117								
WG2718338-1 CRM		**VA-ORP**						
ORP			222		mV		210-230	17-FEB-18
P-T-PRES-COL-VA	**Water**							
Batch R3962544								
WG2717405-6 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			100.0		%		80-120	16-FEB-18
WG2717405-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	16-FEB-18
PH-PCT-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-PCT-VA	**Water**							
Batch R3964667								
WG2717862-2 CRM		**VA-PH7-BUF**						
pH			7.04		pH		6.9-7.1	16-FEB-18
PO4-DO-COL-VA	**Water**							
Batch R3962018								
WG2717384-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			95.0		%		80-120	16-FEB-18
WG2717384-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			93.2		%		80-120	16-FEB-18
WG2717384-6 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			92.7		%		80-120	16-FEB-18
WG2717384-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	16-FEB-18
WG2717384-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	16-FEB-18
WG2717384-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	16-FEB-18
SO4-IC-N-VA	**Water**							
Batch R3964889								
WG2717860-2 LCS								
Sulfate (SO4)			99.4		%		90-110	16-FEB-18
WG2717860-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	16-FEB-18
TDS-LOW-VA	**Water**							
Batch R3963918								
WG2717853-2 LCS								
Total Dissolved Solids			100.9		%		85-115	16-FEB-18
WG2717853-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	16-FEB-18
TKN-F-VA	**Water**							
Batch R3966408								
WG2717727-2 LCS								
Total Kjeldahl Nitrogen			99.3		%		75-125	19-FEB-18
WG2717727-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	19-FEB-18
TSS-LOW-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-LOW-VA	**Water**							
Batch R3963810								
WG2717442-2 LCS								
Total Suspended Solids			104.0		%		85-115	16-FEB-18
WG2717442-1 MB								
Total Suspended Solids			<1.0		mg/L		1	16-FEB-18
TURBIDITY-VA	**Water**							
Batch R3961965								
WG2717320-11 CRM		**VA-FORM-40**						
Turbidity			94.5		%		85-115	15-FEB-18
WG2717320-14 CRM		**VA-FORM-40**						
Turbidity			94.3		%		85-115	15-FEB-18
WG2717320-17 CRM		**VA-FORM-40**						
Turbidity			95.0		%		85-115	15-FEB-18
WG2717320-2 CRM		**VA-FORM-40**						
Turbidity			93.8		%		85-115	15-FEB-18
WG2717320-5 CRM		**VA-FORM-40**						
Turbidity			94.8		%		85-115	15-FEB-18
WG2717320-8 CRM		**VA-FORM-40**						
Turbidity			94.5		%		85-115	15-FEB-18
WG2717320-1 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18
WG2717320-10 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18
WG2717320-13 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18
WG2717320-16 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18
WG2717320-4 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18
WG2717320-7 MB								
Turbidity			<0.10		NTU		0.1	15-FEB-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	13-FEB-18 14:02	17-FEB-18 15:00	0.25	97	hours	EHTR-FM
pH by Meter (Automated)							
	1	13-FEB-18 14:02	16-FEB-18 10:47	0.25	69	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2057118 were received on 15-FEB-18 11:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	07-01_2018-02-13	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Lee Wilm			Lab Contact	Can Dang			Email 1:	lee.wilm@teck.com	X	X	X
Email	lee.wilm@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	PO Box 1777, 124B Aspen Drive			Address	8081 Lougheed Hwy			Email 3:	andrew.wight@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-865-5289			Phone Number	604-253-4188			PO number				

SAMPLE DETAILS — ANALYSIS REQUESTED

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: Bottle Type	F	N	F	N	F	N	N					
								PRESERV.	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3						
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-07-01_WP_Q1-2018_NP	RG_DW-07-01	WP	N	13-Feb-18	1402	G	7		1	1	1	1	1	1	1					

L2057118-COFC

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	A-WIGHT	13 Feb '18 1500	J (Z4), S'C	FEB 15 2018 11 10 AM

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	A.Wight	Mobile #	250-433-1159
Sampler's Signature	A-Wight	Date/Time	~~November 21, 2017~~ 13th Feb '18 1500

Teck Coal Ltd.
ATTN: Lee Wilm
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 02-MAY-18
Report Date: 11-MAY-18 16:57 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2088167

Project P.O. #: VPO00563596
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 01-03_2018-04-30
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2088167-1				
	Description	WP				
	Sampled Date	30-APR-18				
	Sampled Time	12:36				
	Client ID	RG_DW-01-03_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	378				
	Hardness (as CaCO3) (mg/L)	182				
	pH (pH)	8.51				
	ORP (mV)	290				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	220				
	Turbidity (NTU)	<0.10				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	152				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	5.4				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	158				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	0.88				
	Fluoride (F) (mg/L)	0.149				
	Nitrate (as N) (mg/L)	0.591				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.091				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	0.0026				
	Sulfate (SO4) (mg/L)	34.4				
	Anion Sum (meq/L)	3.94				
	Cation Sum (meq/L)	3.70				
	Cation - Anion Balance (%)	-3.1				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50				
	Total Organic Carbon (mg/L)	0.67				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00014				
	Barium (Ba)-Total (mg/L)	0.0801				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (ug/L)	<0.0050				
	Calcium (Ca)-Total (mg/L)	55.4				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2088167-1				
	Description	WP				
	Sampled Date	30-APR-18				
	Sampled Time	12:36				
	Client ID	RG_DW-01-03_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00026				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.00123				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	0.0022				
	Magnesium (Mg)-Total (mg/L)	14.0				
	Manganese (Mn)-Total (mg/L)	<0.00010				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.000987				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Potassium (K)-Total (mg/L)	0.444				
	Selenium (Se)-Total (ug/L)	2.95				
	Silicon (Si)-Total (mg/L)	2.19				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	1.40				
	Strontium (Sr)-Total (mg/L)	0.214				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.000808				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0057				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.0734				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (ug/L)	0.0084				
	Calcium (Ca)-Dissolved (mg/L)	50.2				
	Chromium (Cr)-Dissolved (mg/L)	0.00027				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00132				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2088167-1				
	Description	WP				
	Sampled Date	30-APR-18				
	Sampled Time	12:36				
	Client ID	RG_DW-01-03_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	0.000143				
	Lithium (Li)-Dissolved (mg/L)	0.0024				
	Magnesium (Mg)-Dissolved (mg/L)	13.7				
	Manganese (Mn)-Dissolved (mg/L)	<0.00010				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000998				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	0.452				
	Selenium (Se)-Dissolved (ug/L)	3.25				
	Silicon (Si)-Dissolved (mg/L)	2.16				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	1.43				
	Strontium (Sr)-Dissolved (mg/L)	0.203				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.000805				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0095				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L2088167-1
Matrix Spike	Dissolved Organic Carbon	MS-B	L2088167-1
Matrix Spike	Total Organic Carbon	MS-B	L2088167-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2088167-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2088167-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2088167-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2088167-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction

Reference Information

with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

01-03_2018-04-30

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4036549								
WG2765159-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			109.0		%		85-115	07-MAY-18
WG2765159-1 MB								
Acidity (as CaCO3)			1.4		mg/L		2	07-MAY-18
ALK-TITR-VA	**Water**							
Batch R4038693								
WG2765157-8 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			98.0		%		85-115	09-MAY-18
WG2765157-6 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	09-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4038472								
WG2766525-2 LCS								
Beryllium (Be)-Dissolved			98.2		%		80-120	08-MAY-18
WG2766525-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	08-MAY-18
BE-T-L-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-2 LCS								
Beryllium (Be)-Total			107.2		%		80-120	08-MAY-18
WG2765762-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	08-MAY-18
WG2765762-4 MS		**L2088167-1**						
Beryllium (Be)-Total			99.0		%		70-130	08-MAY-18
BR-L-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Bromide (Br)			92.3		%		85-115	05-MAY-18
WG2764850-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	05-MAY-18
WG2764850-12 MS		**L2088167-1**						
Bromide (Br)			99.5		%		75-125	05-MAY-18
CARBONS-DOC-VA	**Water**							
Batch R4036087								
WG2766291-12 LCS								
Dissolved Organic Carbon			100.5		%		80-120	07-MAY-18
WG2766291-16 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4036087								
WG2766291-16 LCS								
Dissolved Organic Carbon			97.7		%		80-120	07-MAY-18
WG2766291-4 LCS								
Dissolved Organic Carbon			98.6		%		80-120	07-MAY-18
WG2766291-8 LCS								
Dissolved Organic Carbon			98.2		%		80-120	07-MAY-18
WG2766291-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766291-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766291-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766291-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766291-10 MS		**L2088167-1**						
Dissolved Organic Carbon			107.0		%		70-130	07-MAY-18
CARBONS-TOC-VA	**Water**							
Batch R4036088								
WG2766290-1 LCS								
Total Organic Carbon			97.8		%		80-120	07-MAY-18
WG2766290-13 LCS								
Total Organic Carbon			98.2		%		80-120	07-MAY-18
WG2766290-17 LCS								
Total Organic Carbon			97.3		%		80-120	07-MAY-18
WG2766290-5 LCS								
Total Organic Carbon			97.8		%		80-120	07-MAY-18
WG2766290-9 LCS								
Total Organic Carbon			98.9		%		80-120	07-MAY-18
WG2766290-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766290-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766290-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766290-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766290-11 MS		**L2088167-1**						
Total Organic Carbon			109.1		%		70-130	07-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-L-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Chloride (Cl)			92.3		%		90-110	05-MAY-18
WG2764850-9 MB								
Chloride (Cl)			<0.10		mg/L		0.1	05-MAY-18
WG2764850-12 MS		**L2088167-1**						
Chloride (Cl)			98.8		%		75-125	05-MAY-18
EC-PCT-VA	**Water**							
Batch R4038693								
WG2765157-9 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			98.5		%		90-110	09-MAY-18
WG2765157-6 MB								
Conductivity			<2.0		uS/cm		2	09-MAY-18
F-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Fluoride (F)			91.9		%		90-110	05-MAY-18
WG2764850-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	05-MAY-18
WG2764850-12 MS		**L2088167-1**						
Fluoride (F)			97.5		%		75-125	05-MAY-18
HG-D-CVAA-VA	**Water**							
Batch R4033477								
WG2765023-7 DUP		**L2088167-1**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	04-MAY-18
WG2765023-6 LCS								
Mercury (Hg)-Dissolved			103.4		%		80-120	04-MAY-18
WG2765023-5 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	04-MAY-18
HG-T-CVAA-VA	**Water**							
Batch R4032708								
WG2764368-2 LCS								
Mercury (Hg)-Total			100.0		%		80-120	03-MAY-18
WG2764368-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	03-MAY-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4038472								
WG2766525-2 LCS								
Aluminum (Al)-Dissolved			102.0		%		80-120	08-MAY-18
Antimony (Sb)-Dissolved			101.3		%		80-120	08-MAY-18
Arsenic (As)-Dissolved			96.5		%		80-120	08-MAY-18
Barium (Ba)-Dissolved			92.7		%		80-120	08-MAY-18
Bismuth (Bi)-Dissolved			95.1		%		80-120	08-MAY-18
Boron (B)-Dissolved			88.8		%		80-120	08-MAY-18
Cadmium (Cd)-Dissolved			96.9		%		80-120	08-MAY-18
Calcium (Ca)-Dissolved			97.1		%		80-120	08-MAY-18
Chromium (Cr)-Dissolved			98.8		%		80-120	08-MAY-18
Cobalt (Co)-Dissolved			95.5		%		80-120	08-MAY-18
Copper (Cu)-Dissolved			97.6		%		80-120	08-MAY-18
Iron (Fe)-Dissolved			94.7		%		80-120	08-MAY-18
Lead (Pb)-Dissolved			97.5		%		80-120	08-MAY-18
Lithium (Li)-Dissolved			100.6		%		80-120	08-MAY-18
Magnesium (Mg)-Dissolved			107.7		%		80-120	08-MAY-18
Manganese (Mn)-Dissolved			96.1		%		80-120	08-MAY-18
Molybdenum (Mo)-Dissolved			98.9		%		80-120	08-MAY-18
Nickel (Ni)-Dissolved			96.6		%		80-120	08-MAY-18
Potassium (K)-Dissolved			100.7		%		80-120	08-MAY-18
Selenium (Se)-Dissolved			96.6		%		80-120	08-MAY-18
Silicon (Si)-Dissolved			96.1		%		80-120	08-MAY-18
Silver (Ag)-Dissolved			101.5		%		80-120	08-MAY-18
Sodium (Na)-Dissolved			103.3		%		80-120	08-MAY-18
Strontium (Sr)-Dissolved			105.7		%		80-120	08-MAY-18
Thallium (Tl)-Dissolved			99.5		%		80-120	08-MAY-18
Tin (Sn)-Dissolved			98.6		%		80-120	08-MAY-18
Titanium (Ti)-Dissolved			98.0		%		80-120	08-MAY-18
Uranium (U)-Dissolved			93.4		%		80-120	08-MAY-18
Vanadium (V)-Dissolved			100.0		%		80-120	08-MAY-18
Zinc (Zn)-Dissolved			95.4		%		80-120	08-MAY-18
WG2766525-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4038472								
WG2766525-1 MB		**NP**						
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	08-MAY-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	08-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	08-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	08-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	08-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	08-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	08-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	08-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	08-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18
Batch R4039365								
WG2766525-1 MB		**NP**						
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	09-MAY-18
MET-T-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-2 LCS								
Aluminum (Al)-Total			105.2		%		80-120	08-MAY-18
Antimony (Sb)-Total			104.8		%		80-120	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-2 LCS								
Arsenic (As)-Total			103.3		%		80-120	08-MAY-18
Barium (Ba)-Total			104.9		%		80-120	08-MAY-18
Bismuth (Bi)-Total			99.9		%		80-120	08-MAY-18
Boron (B)-Total			88.5		%		80-120	08-MAY-18
Cadmium (Cd)-Total			103.8		%		80-120	08-MAY-18
Calcium (Ca)-Total			102.0		%		80-120	08-MAY-18
Chromium (Cr)-Total			98.5		%		80-120	08-MAY-18
Cobalt (Co)-Total			102.4		%		80-120	08-MAY-18
Copper (Cu)-Total			103.7		%		80-120	08-MAY-18
Iron (Fe)-Total			100.1		%		80-120	08-MAY-18
Lead (Pb)-Total			101.2		%		80-120	08-MAY-18
Lithium (Li)-Total			103.2		%		80-120	08-MAY-18
Magnesium (Mg)-Total			103.9		%		80-120	08-MAY-18
Manganese (Mn)-Total			106.0		%		80-120	08-MAY-18
Molybdenum (Mo)-Total			103.9		%		80-120	08-MAY-18
Nickel (Ni)-Total			103.9		%		80-120	08-MAY-18
Potassium (K)-Total			105.9		%		80-120	08-MAY-18
Selenium (Se)-Total			111.9		%		80-120	08-MAY-18
Silicon (Si)-Total			107.9		%		80-120	08-MAY-18
Silver (Ag)-Total			105.6		%		80-120	08-MAY-18
Sodium (Na)-Total			105.1		%		80-120	08-MAY-18
Strontium (Sr)-Total			101.5		%		80-120	08-MAY-18
Thallium (Tl)-Total			100.7		%		80-120	08-MAY-18
Tin (Sn)-Total			101.5		%		80-120	08-MAY-18
Titanium (Ti)-Total			103.5		%		80-120	08-MAY-18
Uranium (U)-Total			100.8		%		80-120	08-MAY-18
Vanadium (V)-Total			105.3		%		80-120	08-MAY-18
Zinc (Zn)-Total			101.2		%		80-120	08-MAY-18
WG2765762-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	08-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-1 MB								
Boron (B)-Total			<0.010		mg/L		0.01	08-MAY-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	08-MAY-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	08-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	08-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	08-MAY-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	08-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	08-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	08-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	08-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	08-MAY-18
Potassium (K)-Total			<0.050		mg/L		0.05	08-MAY-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	08-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	08-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	08-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	08-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	08-MAY-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	08-MAY-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	08-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	08-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	08-MAY-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	08-MAY-18
WG2765762-4 MS		**L2088167-1**						
Aluminum (Al)-Total			102.3		%		70-130	08-MAY-18
Antimony (Sb)-Total			102.6		%		70-130	08-MAY-18
Arsenic (As)-Total			107.0		%		70-130	08-MAY-18
Barium (Ba)-Total			N/A	MS-B	%		-	08-MAY-18
Bismuth (Bi)-Total			96.0		%		70-130	08-MAY-18
Boron (B)-Total			87.5		%		70-130	08-MAY-18
Cadmium (Cd)-Total			102.3		%		70-130	08-MAY-18
Calcium (Ca)-Total			N/A	MS-B	%		-	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-4 MS		**L2088167-1**						
Chromium (Cr)-Total			105.4		%		70-130	08-MAY-18
Cobalt (Co)-Total			100.9		%		70-130	08-MAY-18
Copper (Cu)-Total			101.3		%		70-130	08-MAY-18
Iron (Fe)-Total			97.2		%		70-130	08-MAY-18
Lead (Pb)-Total			96.8		%		70-130	08-MAY-18
Lithium (Li)-Total			98.3		%		70-130	08-MAY-18
Magnesium (Mg)-Total			N/A	MS-B	%		-	08-MAY-18
Manganese (Mn)-Total			104.0		%		70-130	08-MAY-18
Molybdenum (Mo)-Total			102.6		%		70-130	08-MAY-18
Nickel (Ni)-Total			101.5		%		70-130	08-MAY-18
Potassium (K)-Total			103.6		%		70-130	08-MAY-18
Selenium (Se)-Total			101.4		%		70-130	08-MAY-18
Silicon (Si)-Total			90.3		%		70-130	08-MAY-18
Silver (Ag)-Total			100.8		%		70-130	08-MAY-18
Sodium (Na)-Total			105.8		%		70-130	08-MAY-18
Strontium (Sr)-Total			N/A	MS-B	%		-	08-MAY-18
Thallium (Tl)-Total			97.0		%		70-130	08-MAY-18
Tin (Sn)-Total			103.0		%		70-130	08-MAY-18
Titanium (Ti)-Total			101.6		%		70-130	08-MAY-18
Uranium (U)-Total			98.6		%		70-130	08-MAY-18
Vanadium (V)-Total			104.0		%		70-130	08-MAY-18
Zinc (Zn)-Total			94.6		%		70-130	08-MAY-18
NH3-F-VA	**Water**							
Batch R4039351								
WG2767883-6 LCS								
Ammonia, Total (as N)			99.6		%		85-115	09-MAY-18
WG2767883-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	09-MAY-18
NO2-L-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Nitrite (as N)			90.7		%		90-110	05-MAY-18
WG2764850-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	05-MAY-18
WG2764850-12 MS		**L2088167-1**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-12 MS		**L2088167-1**						
Nitrite (as N)			95.2		%		75-125	05-MAY-18
NO3-L-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Nitrate (as N)			93.0		%		90-110	05-MAY-18
WG2764850-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	05-MAY-18
WG2764850-12 MS		**L2088167-1**						
Nitrate (as N)			99.6		%		75-125	05-MAY-18
ORP-VA	**Water**							
Batch R4033768								
WG2765565-1 CRM		**VA-ORP**						
ORP			220		mV		210-230	05-MAY-18
P-T-PRES-COL-VA	**Water**							
Batch R4033255								
WG2764244-10 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			94.4		%		80-120	04-MAY-18
WG2764244-9 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	04-MAY-18
PH-PCT-VA	**Water**							
Batch R4038693								
WG2765157-7 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-MAY-18
PO4-DO-COL-VA	**Water**							
Batch R4031186								
WG2763590-18 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.8		%		80-120	02-MAY-18
WG2763590-17 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAY-18
SO4-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Sulfate (SO4)			94.2		%		90-110	05-MAY-18
WG2764850-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	05-MAY-18
WG2764850-12 MS		**L2088167-1**						
Sulfate (SO4)			98.2		%		75-125	05-MAY-18
TDS-LOW-VA	**Water**							
Batch R4037942								
WG2766491-2 LCS								
Total Dissolved Solids			98.4		%		85-115	07-MAY-18
WG2766491-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	07-MAY-18
TKN-F-VA	**Water**							
Batch R4033711								
WG2764322-6 LCS								
Total Kjeldahl Nitrogen			101.1		%		75-125	05-MAY-18
WG2764322-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	05-MAY-18
WG2764322-8 MS		**L2088167-1**						
Total Kjeldahl Nitrogen			103.6		%		70-130	05-MAY-18
TSS-LOW-VA	**Water**							
Batch R4036050								
WG2765581-4 LCS								
Total Suspended Solids			101.3		%		85-115	05-MAY-18
WG2765581-3 MB								
Total Suspended Solids			<1.0		mg/L		1	05-MAY-18
TURBIDITY-VA	**Water**							
Batch R4032660								
WG2764218-2 CRM		**VA-FORM-40**						
Turbidity			101.0		%		85-115	03-MAY-18
WG2764218-5 CRM		**VA-FORM-40**						
Turbidity			99.8		%		85-115	03-MAY-18
WG2764218-1 MB								
Turbidity			<0.10		NTU		0.1	03-MAY-18
WG2764218-4 MB								
Turbidity			<0.10		NTU		0.1	03-MAY-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	30-APR-18 12:36	05-MAY-18 13:00	0.25	120	hours	EHTR-FM
pH by Meter (Automated)							
	1	30-APR-18 12:36	07-MAY-18 20:30	0.25	176	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	30-APR-18 12:36	05-MAY-18 09:00	3	5	days	EHTL
Nitrite in Water by IC (Low Level)							
	1	30-APR-18 12:36	05-MAY-18 09:00	3	5	days	EHTL

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2088167 were received on 02-MAY-18 13:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	01-03_2018-04-30	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Lee Wilm			Lab Contact	Can Dang			Email 1:	lee.wilm@teck.com	X	X	X
Email	lee.wilm@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	PO Box 1777, 124B Aspen Drive			Address	8081 Lougheed Hwy			Email 3:	andrew.wight@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	cait.good@teck.com	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-865-5289			Phone Number	604-253-4188			PO number				

SAMPLE DETAILS — **ANALYSIS REQUESTED** (Filtered - F; Field, L; Lab, FL; Field & Lab, N; None)

L2088167-COFC

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	F	N	F	N	F	N	N					
								PRESERV	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3						
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-01-03_WP_Q2-2018_NP	RG_DW-01-03	WP	N	30-Apr-18	1236	G	7		1	1	1	1	1	1	1					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	A. WIGHT	30 April '18 1545	JC 8'c Z1	MAY - 2 2018 13:10

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	A.Wight	Mobile #	250-433-1159
Sampler's Signature	A. Wight	Date/Time	April 30, 2018 1545

Teck Coal Ltd.
ATTN: Lee Wilm
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 02-MAY-18
Report Date: 11-MAY-18 17:13 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2088168

Project P.O. #: VPO00563596
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 01-07_2018-04-30
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2088168-1				
	Description	WP				
	Sampled Date	30-APR-18				
	Sampled Time	13:25				
	Client ID	RG_DW-01-07_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	825				
	Hardness (as CaCO3) (mg/L)	502				
	pH (pH)	7.95				
	ORP (mV)	323				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	575				
	Turbidity (NTU)	0.17				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	9.7				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	300				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	300				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.25 DLDS				
	Chloride (Cl) (mg/L)	44.5				
	Fluoride (F) (mg/L)	<0.10 DLDS				
	Nitrate (as N) (mg/L)	0.987				
	Nitrite (as N) (mg/L)	<0.0050 DLDS				
	Total Kjeldahl Nitrogen (mg/L)	0.157				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0012				
	Phosphorus (P)-Total (mg/L)	0.0045				
	Sulfate (SO4) (mg/L)	57.3				
	Anion Sum (meq/L)	8.52				
	Cation Sum (meq/L)	10.5				
	Cation - Anion Balance (%)	10.3				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.66				
	Total Organic Carbon (mg/L)	1.28				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	0.00010				
	Arsenic (As)-Total (mg/L)	0.00014				
	Barium (Ba)-Total (mg/L)	0.144				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.018				
	Cadmium (Cd)-Total (ug/L)	0.0412				
	Calcium (Ca)-Total (mg/L)	127				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2088168-1				
	Description	WP				
	Sampled Date	30-APR-18				
	Sampled Time	13:25				
	Client ID	RG_DW-01-07_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00017				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.0183				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	0.000755				
	Lithium (Li)-Total (mg/L)	0.0077				
	Magnesium (Mg)-Total (mg/L)	46.2				
	Manganese (Mn)-Total (mg/L)	0.00022				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00391				
	Nickel (Ni)-Total (mg/L)	0.00130				
	Potassium (K)-Total (mg/L)	0.998				
	Selenium (Se)-Total (ug/L)	1.46				
	Silicon (Si)-Total (mg/L)	6.70				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	9.44				
	Strontium (Sr)-Total (mg/L)	0.325				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	0.00017				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00171				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0402				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.132				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.018				
	Cadmium (Cd)-Dissolved (ug/L)	0.0524				
	Calcium (Ca)-Dissolved (mg/L)	125				
	Chromium (Cr)-Dissolved (mg/L)	0.00015				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00199				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2088168-1				
	Description	WP				
	Sampled Date	30-APR-18				
	Sampled Time	13:25				
	Client ID	RG_DW-01-07_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	0.000067				
	Lithium (Li)-Dissolved (mg/L)	0.0077				
	Magnesium (Mg)-Dissolved (mg/L)	46.1				
	Manganese (Mn)-Dissolved (mg/L)	0.00011				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00393				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	1.11				
	Selenium (Se)-Dissolved (ug/L)	1.66				
	Silicon (Si)-Dissolved (mg/L)	6.52				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	9.53				
	Strontium (Sr)-Dissolved (mg/L)	0.329				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00167				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0081				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L2088168-1
Matrix Spike	Dissolved Organic Carbon	MS-B	L2088168-1
Matrix Spike	Total Organic Carbon	MS-B	L2088168-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2088168-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2088168-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2088168-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2088168-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Reference Information

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

01-07_2018-04-30

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4036549								
WG2765159-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			109.0		%		85-115	07-MAY-18
WG2765159-1 MB								
Acidity (as CaCO3)			1.4		mg/L		2	07-MAY-18
ALK-TITR-VA	**Water**							
Batch R4038693								
WG2765157-8 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			98.0		%		85-115	09-MAY-18
WG2765157-6 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	09-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4038472								
WG2766525-2 LCS								
Beryllium (Be)-Dissolved			98.2		%		80-120	08-MAY-18
WG2766525-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	08-MAY-18
BE-T-L-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-3 DUP		**L2088168-1**						
Beryllium (Be)-Total		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	08-MAY-18
WG2765762-2 LCS								
Beryllium (Be)-Total			107.2		%		80-120	08-MAY-18
WG2765762-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	08-MAY-18
BR-L-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Bromide (Br)			92.3		%		85-115	05-MAY-18
WG2764850-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	05-MAY-18
CARBONS-DOC-VA	**Water**							
Batch R4036087								
WG2766291-12 LCS								
Dissolved Organic Carbon			100.5		%		80-120	07-MAY-18
WG2766291-16 LCS								
Dissolved Organic Carbon			97.7		%		80-120	07-MAY-18
WG2766291-4 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4036087								
WG2766291-4 LCS								
Dissolved Organic Carbon			98.6		%		80-120	07-MAY-18
WG2766291-8 LCS								
Dissolved Organic Carbon			98.2		%		80-120	07-MAY-18
WG2766291-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766291-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766291-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766291-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
CARBONS-TOC-VA	**Water**							
Batch R4036088								
WG2766290-1 LCS								
Total Organic Carbon			97.8		%		80-120	07-MAY-18
WG2766290-13 LCS								
Total Organic Carbon			98.2		%		80-120	07-MAY-18
WG2766290-17 LCS								
Total Organic Carbon			97.3		%		80-120	07-MAY-18
WG2766290-5 LCS								
Total Organic Carbon			97.8		%		80-120	07-MAY-18
WG2766290-9 LCS								
Total Organic Carbon			98.9		%		80-120	07-MAY-18
WG2766290-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766290-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766290-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766290-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
CL-L-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Chloride (Cl)			92.3		%		90-110	05-MAY-18
WG2764850-9 MB								
Chloride (Cl)			<0.10		mg/L		0.1	05-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-PCT-VA	**Water**							
Batch R4038693								
WG2765157-9 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			98.5		%		90-110	09-MAY-18
WG2765157-6 MB								
Conductivity			<2.0		uS/cm		2	09-MAY-18
F-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Fluoride (F)			91.9		%		90-110	05-MAY-18
WG2764850-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	05-MAY-18
HG-D-CVAA-VA	**Water**							
Batch R4033477								
WG2765023-6 LCS								
Mercury (Hg)-Dissolved			103.4		%		80-120	04-MAY-18
WG2765023-5 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005		mg/L		0.000005	04-MAY-18
HG-T-CVAA-VA	**Water**							
Batch R4032708								
WG2764368-2 LCS								
Mercury (Hg)-Total			100.0		%		80-120	03-MAY-18
WG2764368-1 MB								
Mercury (Hg)-Total			<0.000005		mg/L		0.000005	03-MAY-18
MET-D-CCMS-VA	**Water**							
Batch R4038472								
WG2766525-2 LCS								
Aluminum (Al)-Dissolved			102.0		%		80-120	08-MAY-18
Antimony (Sb)-Dissolved			101.3		%		80-120	08-MAY-18
Arsenic (As)-Dissolved			96.5		%		80-120	08-MAY-18
Barium (Ba)-Dissolved			92.7		%		80-120	08-MAY-18
Bismuth (Bi)-Dissolved			95.1		%		80-120	08-MAY-18
Boron (B)-Dissolved			88.8		%		80-120	08-MAY-18
Cadmium (Cd)-Dissolved			96.9		%		80-120	08-MAY-18
Calcium (Ca)-Dissolved			97.1		%		80-120	08-MAY-18
Chromium (Cr)-Dissolved			98.8		%		80-120	08-MAY-18
Cobalt (Co)-Dissolved			95.5		%		80-120	08-MAY-18
Copper (Cu)-Dissolved			97.6		%		80-120	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4038472								
WG2766525-2 LCS								
Iron (Fe)-Dissolved			94.7		%		80-120	08-MAY-18
Lead (Pb)-Dissolved			97.5		%		80-120	08-MAY-18
Lithium (Li)-Dissolved			100.6		%		80-120	08-MAY-18
Magnesium (Mg)-Dissolved			107.7		%		80-120	08-MAY-18
Manganese (Mn)-Dissolved			96.1		%		80-120	08-MAY-18
Molybdenum (Mo)-Dissolved			98.9		%		80-120	08-MAY-18
Nickel (Ni)-Dissolved			96.6		%		80-120	08-MAY-18
Potassium (K)-Dissolved			100.7		%		80-120	08-MAY-18
Selenium (Se)-Dissolved			96.6		%		80-120	08-MAY-18
Silicon (Si)-Dissolved			96.1		%		80-120	08-MAY-18
Silver (Ag)-Dissolved			101.5		%		80-120	08-MAY-18
Sodium (Na)-Dissolved			103.3		%		80-120	08-MAY-18
Strontium (Sr)-Dissolved			105.7		%		80-120	08-MAY-18
Thallium (Tl)-Dissolved			99.5		%		80-120	08-MAY-18
Tin (Sn)-Dissolved			98.6		%		80-120	08-MAY-18
Titanium (Ti)-Dissolved			98.0		%		80-120	08-MAY-18
Uranium (U)-Dissolved			93.4		%		80-120	08-MAY-18
Vanadium (V)-Dissolved			100.0		%		80-120	08-MAY-18
Zinc (Zn)-Dissolved			95.4		%		80-120	08-MAY-18
WG2766525-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	08-MAY-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	08-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	08-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	08-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4038472								
WG2766525-1 MB		**NP**						
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	08-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	08-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	08-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	08-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	08-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18
Batch R4039365								
WG2766525-1 MB		**NP**						
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	09-MAY-18
MET-T-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-3 DUP		**L2088168-1**						
Aluminum (Al)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	08-MAY-18
Antimony (Sb)-Total		0.00010	<0.00010	RPD-NA	mg/L	N/A	20	08-MAY-18
Arsenic (As)-Total		0.00014	0.00015		mg/L	12	20	08-MAY-18
Barium (Ba)-Total		0.144	0.143		mg/L	0.7	20	08-MAY-18
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	08-MAY-18
Boron (B)-Total		0.018	0.018		mg/L	1.4	20	08-MAY-18
Cadmium (Cd)-Total		0.0000412	0.0000467		mg/L	13	20	08-MAY-18
Calcium (Ca)-Total		127	126		mg/L	0.5	20	08-MAY-18
Chromium (Cr)-Total		0.00017	0.00021	J	mg/L	0.00004	0.0002	08-MAY-18
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	08-MAY-18
Copper (Cu)-Total		0.0183	0.0184		mg/L	0.6	20	08-MAY-18
Iron (Fe)-Total		<0.010	0.010	RPD-NA	mg/L	N/A	20	08-MAY-18
Lead (Pb)-Total		0.000755	0.000752		mg/L	0.3	20	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-3 DUP		**L2088168-1**						
Lithium (Li)-Total		0.0077	0.0076		mg/L	1.0	20	08-MAY-18
Magnesium (Mg)-Total		46.2	45.7		mg/L	1.0	20	08-MAY-18
Manganese (Mn)-Total		0.00022	0.00021		mg/L	5.1	20	08-MAY-18
Molybdenum (Mo)-Total		0.00391	0.00397		mg/L	1.7	20	08-MAY-18
Nickel (Ni)-Total		0.00130	0.00126		mg/L	2.7	20	08-MAY-18
Potassium (K)-Total		0.998	1.01		mg/L	0.8	20	08-MAY-18
Selenium (Se)-Total		0.00146	0.00137		mg/L	6.7	20	08-MAY-18
Silicon (Si)-Total		6.70	6.67		mg/L	0.4	20	08-MAY-18
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	08-MAY-18
Sodium (Na)-Total		9.44	9.30		mg/L	1.5	20	08-MAY-18
Strontium (Sr)-Total		0.325	0.326		mg/L	0.3	20	08-MAY-18
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	08-MAY-18
Tin (Sn)-Total		0.00017	0.00017		mg/L	0.5	20	08-MAY-18
Titanium (Ti)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	08-MAY-18
Uranium (U)-Total		0.00171	0.00167		mg/L	2.4	20	08-MAY-18
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	08-MAY-18
Zinc (Zn)-Total		0.0402	0.0400		mg/L	0.5	20	08-MAY-18
WG2765762-2 LCS								
Aluminum (Al)-Total			105.2		%		80-120	08-MAY-18
Antimony (Sb)-Total			104.8		%		80-120	08-MAY-18
Arsenic (As)-Total			103.3		%		80-120	08-MAY-18
Barium (Ba)-Total			104.9		%		80-120	08-MAY-18
Bismuth (Bi)-Total			99.9		%		80-120	08-MAY-18
Boron (B)-Total			88.5		%		80-120	08-MAY-18
Cadmium (Cd)-Total			103.8		%		80-120	08-MAY-18
Calcium (Ca)-Total			102.0		%		80-120	08-MAY-18
Chromium (Cr)-Total			98.5		%		80-120	08-MAY-18
Cobalt (Co)-Total			102.4		%		80-120	08-MAY-18
Copper (Cu)-Total			103.7		%		80-120	08-MAY-18
Iron (Fe)-Total			100.1		%		80-120	08-MAY-18
Lead (Pb)-Total			101.2		%		80-120	08-MAY-18
Lithium (Li)-Total			103.2		%		80-120	08-MAY-18
Magnesium (Mg)-Total			103.9		%		80-120	08-MAY-18
Manganese (Mn)-Total			106.0		%		80-120	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-2 LCS								
Molybdenum (Mo)-Total			103.9		%		80-120	08-MAY-18
Nickel (Ni)-Total			103.9		%		80-120	08-MAY-18
Potassium (K)-Total			105.9		%		80-120	08-MAY-18
Selenium (Se)-Total			111.9		%		80-120	08-MAY-18
Silicon (Si)-Total			107.9		%		80-120	08-MAY-18
Silver (Ag)-Total			105.6		%		80-120	08-MAY-18
Sodium (Na)-Total			105.1		%		80-120	08-MAY-18
Strontium (Sr)-Total			101.5		%		80-120	08-MAY-18
Thallium (Tl)-Total			100.7		%		80-120	08-MAY-18
Tin (Sn)-Total			101.5		%		80-120	08-MAY-18
Titanium (Ti)-Total			103.5		%		80-120	08-MAY-18
Uranium (U)-Total			100.8		%		80-120	08-MAY-18
Vanadium (V)-Total			105.3		%		80-120	08-MAY-18
Zinc (Zn)-Total			101.2		%		80-120	08-MAY-18
WG2765762-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	08-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	08-MAY-18
Boron (B)-Total			<0.010		mg/L		0.01	08-MAY-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	08-MAY-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	08-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	08-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	08-MAY-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	08-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	08-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	08-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	08-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	08-MAY-18
Potassium (K)-Total			<0.050		mg/L		0.05	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-1 MB								
Selenium (Se)-Total			<0.000050		mg/L		0.00005	08-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	08-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	08-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	08-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	08-MAY-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	08-MAY-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	08-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	08-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	08-MAY-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	08-MAY-18
NH3-F-VA	**Water**							
Batch R4039351								
WG2767883-7 DUP		**L2088168-1**						
Ammonia, Total (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	09-MAY-18
WG2767883-6 LCS								
Ammonia, Total (as N)			99.6		%		85-115	09-MAY-18
WG2767883-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	09-MAY-18
WG2767883-8 MS		**L2088168-1**						
Ammonia, Total (as N)			100.8		%		75-125	09-MAY-18
NO2-L-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Nitrite (as N)			90.7		%		90-110	05-MAY-18
WG2764850-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	05-MAY-18
NO3-L-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Nitrate (as N)			93.0		%		90-110	05-MAY-18
WG2764850-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	05-MAY-18
ORP-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ORP-VA	**Water**							
Batch R4033768								
WG2765565-1 CRM		**VA-ORP**						
ORP			220		mV		210-230	05-MAY-18
P-T-PRES-COL-VA	**Water**							
Batch R4033255								
WG2764244-10 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			94.4		%		80-120	04-MAY-18
WG2764244-9 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	04-MAY-18
PH-PCT-VA	**Water**							
Batch R4038693								
WG2765157-7 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	09-MAY-18
PO4-DO-COL-VA	**Water**							
Batch R4031186								
WG2763590-18 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.8		%		80-120	02-MAY-18
WG2763590-17 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAY-18
SO4-IC-N-VA	**Water**							
Batch R4035769								
WG2764850-10 LCS								
Sulfate (SO4)			94.2		%		90-110	05-MAY-18
WG2764850-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	05-MAY-18
TDS-LOW-VA	**Water**							
Batch R4037942								
WG2766491-2 LCS								
Total Dissolved Solids			98.4		%		85-115	07-MAY-18
WG2766491-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	07-MAY-18
TKN-F-VA	**Water**							
Batch R4033711								
WG2764322-6 LCS								
Total Kjeldahl Nitrogen			101.1		%		75-125	05-MAY-18
WG2764322-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-F-VA	**Water**							
Batch R4033711								
WG2764322-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	05-MAY-18
TSS-LOW-VA	**Water**							
Batch R4036050								
WG2765581-4 LCS								
Total Suspended Solids			101.3		%		85-115	05-MAY-18
WG2765581-3 MB								
Total Suspended Solids			<1.0		mg/L		1	05-MAY-18
TURBIDITY-VA	**Water**							
Batch R4032660								
WG2764218-2 CRM		**VA-FORM-40**						
Turbidity			101.0		%		85-115	03-MAY-18
WG2764218-5 CRM		**VA-FORM-40**						
Turbidity			99.8		%		85-115	03-MAY-18
WG2764218-1 MB								
Turbidity			<0.10		NTU		0.1	03-MAY-18
WG2764218-4 MB								
Turbidity			<0.10		NTU		0.1	03-MAY-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	30-APR-18 13:25	05-MAY-18 13:00	0.25	120	hours	EHTR-FM
pH by Meter (Automated)							
	1	30-APR-18 13:25	07-MAY-18 20:30	0.25	175	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	30-APR-18 13:25	05-MAY-18 09:00	3	5	days	EHTL
Nitrite in Water by IC (Low Level)							
	1	30-APR-18 13:25	05-MAY-18 09:00	3	5	days	EHTL

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2088168 were received on 02-MAY-18 13:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	01-07_2018-04-30	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Lee Wilm			Lab Contact	Can Dang			Email 1:	lee.wilm@teck.com	X	X	X
Email	lee.wilm@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	PO Box 1777, 124B Aspen Drive			Address	8081 Lougheed Hwy			Email 3:	andrew.wight@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	cait.good@teck.com	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-865-5289			Phone Number	604-253-4188			PO number				

SAMPLE DETAILS

ANALYSIS REQUESTED — Filtered - F; Field, L; Lab, FL; Field & Lab, N; None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIELD	F	N	F	N	F	N	N					
								PRESERV.	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3						
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-01-07_WP_Q2-2018_NP	RG_DW-01-07	WP		30-Apr-18	1325	G	7		1	1	1	1	1	1	1					

L2088168-COFC

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	A. WIGHT	30 Apr '18 1545	JC ZI SC	MAY - 2 2018 13:10

SERVICE REQUEST (rush - subject to availability)	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	A.Wight	Mobile #	250-433-1159
Sampler's Signature	A Wight	Date/Time	April 30, 2018 1545

ATTACHMENT 2

List of Analyzed Constituents, Applicable Guidelines and Additional Information

Attachment 2- List of Analyzed Parameters, Applicable Guidelines and Additional Information

Table1 below provides a list of analyzed parameters for the water sampling program along with water quality guidelines for human and livestock consumption.

Table 1: Summary of Analytical Parameters and Applicable Parameters

Parameter	Guidelines for Drinking Water, Health Canada 2017[1]	Guidelines for Livestock Watering, BC[2,3]	Common Sources per Heath Canada, 2017[1]	Health Considerations per Health Canada, 2017[1]	Comments per Heath Canada, 2017[1]
Selenium	0.05 mg/L (MAC[4])	0.03 mg/L	Naturally occurring (erosion and weathering of rocks and soils) and release from coal ash from coal-fired power plants and mining, refining of copper and other metals.	Health basis of MAC: chronic selenosis symptoms in humans following exposure to high levels Other: Hair loss, tooth decay, weakened nails and nervous system disturbances at extremely high levels of exposure	Selenium is an essential nutrient. Most exposure is from food; little information on toxicity of selenium from drinking water. Selenium can be found in non-leaded brass alloy where it is added to replace lead.
Sulphate	<than or = to 500 mg/L (AO[5])	1,000 mg/L (dissolved	Industrial wastes.	High levels (above 500 mg/L) can cause physiological effects such as diarrhoea or dehydration	Based on taste; it is recommended that health authorities be notified of drinking water sources containing sulphate concentrations above 500 mg/L.
Nitrate	45 as nitrate; 10 as nitrate-nitrogen (MAC[4])	100 mg/L	Naturally occurring; leaching or runoff from agricultural fertilizer use, manure and domestic sewage; may be produced from excess ammonia or nitirification in the distribution system	Health basis of MAC: Methaemoglobinaemia (blue baby syndrome) and effects on thyroid gland function in bottle-fed infants Other: Classified as possible carcinogen under conditions that result in endogenous nitrosation	Systems using chloramine disinfection or that have naturally occurring ammonia should monitor the level of nitrite in the distribution system. Homeowners with a well should test concentration of nitrite in their water supply.
Cadmium	0.005 mg/L (MAC[4])	0.08 mg/L (total)	Leaching from galvanized pipes, solders or black polyethylene pipes; industrial and municipal waste.	Health basis of MAC: Kidney damage and softening of bone	None

Nitrite	3 as nitrite; 1 as nitrite-nitrogen (MAC[4])	10 mg/L	Naturally occurring; leaching or runoff from agricultural fertilizer use, manure and domestic sewage; may be produced from excess ammonia or from microbial activity in distribution system	Health basis of MAC: Methaemoglobinaemia (blue baby syndrome) in bottle-fed infants less than 6 months of age Other: Classified as possible carcinogen under conditions that result in endogenous nitrosation	Systems using chloramine disinfection or that have naturally occurring ammonia should monitor the level of nitrite in the distribution system. Homeowners with a well should test concentration of nitrite in their water supply.
Chloride	<than or= to 250 mg/L (AO[5])	600 mg/L	Naturally occurring (seawater intrusion); dissolved salt deposits, highway salt, industrial effluents, oil well operations, sewage, irrigation drainage, refuse leachate.	None	Based on taste and potential for corrosion in the distribution system.
Hardness	None	None	Naturally occurring (sedimentary rock erosion and seepage, runoff from soils); levels generally higher in groundwater.	Although hardness may have significant aesthetic effects, a guideline has not been established because public acceptance of hardness may vary considerably according to the local conditions; major contributors to hardness -- calcium and magnesium -- are not of direct public health concern	Hardness levels between 80 and 100 mg/L (as CaC03) provide acceptable balance between corrosion and incrustation; where a water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended.
Calcium	None	1000mg/L (dissolved)[3]	Naturally occurring (erosion and weathering of soils, minerals, ores).	None	Guideline value not necessary, as there is no evidence of adverse health effects from calcium in drinking water; calcium contributes to hardness.
Sodium	<than or = to 200 mg/L (AO[5])	None	Naturally occurring (erosion and weathering of salt deposits and contact with igneous rock, seawater intrusion); sewage and industrial effluents; sodium-based water softeners.	None	Based on taste; where a sodium- based water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended.
Magnesium	None	None	Naturally occurring (erosion and weathering of rocks and minerals).	None	Guideline value not necessary, as there is no evidence of adverse health effects from magnesium in drinking water.

Notes:

1) Copied from *Table 2. Chemical and Physical Parameters,* Health Canada website (www.healthcanada.gc.ca/waterquality}, February 2017.
2) Water Quality Guidelines (Criteria) Reports- approved WQ guidelines shown unless otherwise noted
3) From *A Compendium of Working WQ Guidelines for British Columbia;* Ministry of Environment; August 2006
4) MAC- Maximum Acceptable Concentration as defined by Health Canada, 2017
5) AO- Aesthetic Objective as defined by Health Canada, 2017

Units of Measure

The concentration of dissolved substances is normally expressed in milligrams per litre (mg/L), which for potable water can also be referred to as parts per million or ppm. In some cases, trace concentrations of dissolved substances will be listed as micrograms per litre (ug/L), or parts per billion (ppb). Table 2 summarizes the main units of measure and equivalent terms.

Units of measure

Unit of Measure	Equivalent Unit of Measure
milligrams per Litre (mg/L)	parts per million (ppm)
micrograms per Litre (µg/L)	parts per billion (ppb)

Explanation of Guideline Terms

Water sampling results for drinking water were compared to *Guidelines for Canadian Drinking Water Quality,* published by Health Canada (2017). Within the Health Canada guidelines guidelines are listed as either a maximum acceptable concentration (MAC) or aesthetic objective (AO). Definitions of the guideline types listed above are provided below:

Health Canada Water Quality Guideline Terms and Definitions

Term	Definition
Aesthetic Objective (AO)	AOs are for specific parameters which affect water quality based on smell, taste or color. There are substances which fall under aesthetic objectives which in high enough quantities may impose a health risk.
Maximum Acceptable Concentration (MAC)	MACs have been developed for parameters, or substances, which are known or suspected to cause deleterious health effects. This term assumes the parameter would be consumed over a lifetime at that concentration.

Teck Coal Ltd.
ATTN: Lee Wilm
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 27-APR-18
Report Date: 07-MAY-18 17:34 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2086019

Project P.O. #: 442460
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 020_2018-04-25
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2086019-1				
	Description	WP				
	Sampled Date	25-APR-18				
	Sampled Time	11:02				
	Client ID	RG_DW-02-20_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	491				
	Hardness (as CaCO3) (mg/L)	250				
	pH (pH)	8.20				
	ORP (mV)	296				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	305				
	Turbidity (NTU)	0.57				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	1.3				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	166				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	5.4				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	172				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	3.07				
	Fluoride (F) (mg/L)	0.200				
	Nitrate (as N) (mg/L)	2.97				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.157 TKNI				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	78.9				
	Anion Sum (meq/L)	5.38				
	Cation Sum (meq/L)	5.12				
	Cation - Anion Balance (%)	-2.5				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.59				
	Total Organic Carbon (mg/L)	0.59				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	<0.00010				
	Barium (Ba)-Total (mg/L)	0.0958				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (ug/L)	0.0125				
	Calcium (Ca)-Total (mg/L)	67.2				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2086019-1				
	Description	WP				
	Sampled Date	25-APR-18				
	Sampled Time	11:02				
	Client ID	RG_DW-02-20_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00034				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.0162				
	Iron (Fe)-Total (mg/L)	0.103				
	Lead (Pb)-Total (mg/L)	0.00110				
	Lithium (Li)-Total (mg/L)	0.0064				
	Magnesium (Mg)-Total (mg/L)	19.7				
	Manganese (Mn)-Total (mg/L)	0.00204				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00112				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Potassium (K)-Total (mg/L)	0.591				
	Selenium (Se)-Total (ug/L)	13.0				
	Silicon (Si)-Total (mg/L)	2.31				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	2.63				
	Strontium (Sr)-Total (mg/L)	0.268				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	0.00194				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00105				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0265				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.0971				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (ug/L)	0.0069				
	Calcium (Ca)-Dissolved (mg/L)	67.1				
	Chromium (Cr)-Dissolved (mg/L)	0.00012				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00625				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2086019-1				
	Description	WP				
	Sampled Date	25-APR-18				
	Sampled Time	11:02				
	Client ID	RG_DW-02-20_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	0.000143				
	Lithium (Li)-Dissolved (mg/L)	0.0064				
	Magnesium (Mg)-Dissolved (mg/L)	20.0				
	Manganese (Mn)-Dissolved (mg/L)	0.00131				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00101				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	0.589				
	Selenium (Se)-Dissolved (ug/L)	12.8				
	Silicon (Si)-Dissolved (mg/L)	2.16				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	2.53				
	Strontium (Sr)-Dissolved (mg/L)	0.248				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00106				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0089				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L2086019-1
Matrix Spike	Total Organic Carbon	MS-B	L2086019-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2086019-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2086019-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2086019-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2086019-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2086019-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Reference Information

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

020_2018-04-25

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4029992								
WG2760837-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			114.4		%		85-115	01-MAY-18
WG2760837-1 MB								
Acidity (as CaCO3)			2.0		mg/L		2	01-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4033572								
WG2763581-3 DUP		**L2086019-1**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	04-MAY-18
WG2763581-2 LCS								
Beryllium (Be)-Dissolved			97.3		%		80-120	04-MAY-18
WG2763581-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	04-MAY-18
BE-T-L-CCMS-VA	**Water**							
Batch R4033596								
WG2763477-2 LCS								
Beryllium (Be)-Total			95.5		%		80-120	04-MAY-18
WG2763477-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	04-MAY-18
BR-L-IC-N-VA	**Water**							
Batch R4026502								
WG2760834-2 LCS								
Bromide (Br)			94.7		%		85-115	29-APR-18
WG2760834-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	29-APR-18
CARBONS-DOC-VA	**Water**							
Batch R4033493								
WG2764119-12 LCS								
Dissolved Organic Carbon			103.3		%		80-120	03-MAY-18
WG2764119-4 LCS								
Dissolved Organic Carbon			103.3		%		80-120	03-MAY-18
WG2764119-8 LCS								
Dissolved Organic Carbon			102.2		%		80-120	03-MAY-18
WG2764119-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	03-MAY-18
WG2764119-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	03-MAY-18
WG2764119-7 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4033493								
WG2764119-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	03-MAY-18
CARBONS-TOC-VA	**Water**							
Batch R4031195								
WG2762702-10 DUP		**L2086019-1**						
Total Organic Carbon		0.59	0.53		mg/L	10	20	02-MAY-18
WG2762702-1 LCS								
Total Organic Carbon			99.8		%		80-120	02-MAY-18
WG2762702-13 LCS								
Total Organic Carbon			103.9		%		80-120	02-MAY-18
WG2762702-5 LCS								
Total Organic Carbon			101.2		%		80-120	02-MAY-18
WG2762702-9 LCS								
Total Organic Carbon			106.8		%		80-120	02-MAY-18
WG2762702-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-MAY-18
WG2762702-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-MAY-18
WG2762702-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-MAY-18
CL-L-IC-N-VA	**Water**							
Batch R4026502								
WG2760834-2 LCS								
Chloride (Cl)			96.1		%		90-110	29-APR-18
WG2760834-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	29-APR-18
EC-PCT-VA	**Water**							
Batch R4032408								
WG2762581-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			99.7		%		90-110	03-MAY-18
WG2762581-1 MB								
Conductivity			<2.0		uS/cm		2	03-MAY-18
F-IC-N-VA	**Water**							
Batch R4026502								
WG2760834-2 LCS								
Fluoride (F)			97.7		%		90-110	29-APR-18
WG2760834-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-VA	**Water**							
Batch R4026502								
WG2760834-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	29-APR-18
HG-D-CVAA-VA	**Water**							
Batch R4030949								
WG2762850-6 LCS								
Mercury (Hg)-Dissolved			98.7		%		80-120	02-MAY-18
HG-T-CVAA-VA	**Water**							
Batch R4030028								
WG2762393-2 LCS								
Mercury (Hg)-Total			100.3		%		80-120	01-MAY-18
WG2762393-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	01-MAY-18
MET-D-CCMS-VA	**Water**							
Batch R4033572								
WG2763581-3 DUP		**L2086019-1**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	04-MAY-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-MAY-18
Arsenic (As)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-MAY-18
Barium (Ba)-Dissolved		0.0971	0.0973		mg/L	0.2	20	04-MAY-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-MAY-18
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-MAY-18
Cadmium (Cd)-Dissolved		0.0000069	0.0000096	J	mg/L	0.000002	0.00001	04-MAY-18
Calcium (Ca)-Dissolved		67.1	68.4		mg/L	1.9	20	04-MAY-18
Chromium (Cr)-Dissolved		0.00012	0.00015	J	mg/L	0.00003	0.0002	04-MAY-18
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-MAY-18
Copper (Cu)-Dissolved		0.00625	0.00641		mg/L	2.5	20	04-MAY-18
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-MAY-18
Lead (Pb)-Dissolved		0.000143	0.000142		mg/L	1.0	20	04-MAY-18
Lithium (Li)-Dissolved		0.0064	0.0061		mg/L	4.3	20	04-MAY-18
Magnesium (Mg)-Dissolved		20.0	20.4		mg/L	2.1	20	04-MAY-18
Manganese (Mn)-Dissolved		0.00131	0.00138		mg/L	5.0	20	04-MAY-18
Molybdenum (Mo)-Dissolved		0.00101	0.00105		mg/L	3.4	20	04-MAY-18
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-MAY-18
Potassium (K)-Dissolved		0.589	0.608		mg/L	3.2	20	04-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4033572								
WG2763581-3 DUP		**L2086019-1**						
Selenium (Se)-Dissolved		0.0128	0.0129		mg/L	0.8	20	04-MAY-18
Silicon (Si)-Dissolved		2.16	2.13		mg/L	1.5	20	04-MAY-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-MAY-18
Sodium (Na)-Dissolved		2.53	2.61		mg/L	3.0	20	04-MAY-18
Strontium (Sr)-Dissolved		0.248	0.255		mg/L	2.7	20	04-MAY-18
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-MAY-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-MAY-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-MAY-18
Uranium (U)-Dissolved		0.00106	0.00107		mg/L	0.5	20	04-MAY-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-MAY-18
Zinc (Zn)-Dissolved		0.0089	0.0095		mg/L	7.1	20	04-MAY-18
WG2763581-2 LCS								
Aluminum (Al)-Dissolved			94.6		%		80-120	04-MAY-18
Antimony (Sb)-Dissolved			92.2		%		80-120	04-MAY-18
Arsenic (As)-Dissolved			96.0		%		80-120	04-MAY-18
Barium (Ba)-Dissolved			98.7		%		80-120	04-MAY-18
Bismuth (Bi)-Dissolved			97.6		%		80-120	04-MAY-18
Boron (B)-Dissolved			92.9		%		80-120	04-MAY-18
Cadmium (Cd)-Dissolved			99.9		%		80-120	04-MAY-18
Calcium (Ca)-Dissolved			99.4		%		80-120	04-MAY-18
Chromium (Cr)-Dissolved			96.1		%		80-120	04-MAY-18
Cobalt (Co)-Dissolved			96.8		%		80-120	04-MAY-18
Copper (Cu)-Dissolved			95.1		%		80-120	04-MAY-18
Iron (Fe)-Dissolved			89.1		%		80-120	04-MAY-18
Lead (Pb)-Dissolved			97.2		%		80-120	04-MAY-18
Lithium (Li)-Dissolved			96.8		%		80-120	04-MAY-18
Magnesium (Mg)-Dissolved			101.4		%		80-120	04-MAY-18
Manganese (Mn)-Dissolved			98.5		%		80-120	04-MAY-18
Molybdenum (Mo)-Dissolved			97.7		%		80-120	04-MAY-18
Nickel (Ni)-Dissolved			95.7		%		80-120	04-MAY-18
Potassium (K)-Dissolved			95.0		%		80-120	04-MAY-18
Selenium (Se)-Dissolved			100.5		%		80-120	04-MAY-18
Silicon (Si)-Dissolved			96.4		%		80-120	04-MAY-18
Silver (Ag)-Dissolved			91.0		%		80-120	04-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4033572								
WG2763581-2 LCS								
Sodium (Na)-Dissolved			100.2		%		80-120	04-MAY-18
Strontium (Sr)-Dissolved			98.2		%		80-120	04-MAY-18
Thallium (Tl)-Dissolved			95.5		%		80-120	04-MAY-18
Tin (Sn)-Dissolved			93.5		%		80-120	04-MAY-18
Titanium (Ti)-Dissolved			92.3		%		80-120	04-MAY-18
Uranium (U)-Dissolved			100.4		%		80-120	04-MAY-18
Vanadium (V)-Dissolved			97.6		%		80-120	04-MAY-18
Zinc (Zn)-Dissolved			93.7		%		80-120	04-MAY-18
WG2763581-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	04-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	04-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	04-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	04-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	04-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	04-MAY-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	04-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	04-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	04-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	04-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	04-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	04-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	04-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	04-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	04-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	04-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	04-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	04-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	04-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	04-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	04-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	04-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	04-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	04-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	04-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4033572								
WG2763581-1 MB		**NP**						
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	04-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	04-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	04-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	04-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	04-MAY-18
MET-T-CCMS-VA	**Water**							
Batch R4033596								
WG2763477-2 LCS								
Aluminum (Al)-Total			101.3		%		80-120	04-MAY-18
Antimony (Sb)-Total			103.3		%		80-120	04-MAY-18
Arsenic (As)-Total			99.0		%		80-120	04-MAY-18
Barium (Ba)-Total			100.3		%		80-120	04-MAY-18
Bismuth (Bi)-Total			97.6		%		80-120	04-MAY-18
Boron (B)-Total			104.0		%		80-120	04-MAY-18
Cadmium (Cd)-Total			99.2		%		80-120	04-MAY-18
Calcium (Ca)-Total			96.6		%		80-120	04-MAY-18
Chromium (Cr)-Total			98.2		%		80-120	04-MAY-18
Cobalt (Co)-Total			97.9		%		80-120	04-MAY-18
Copper (Cu)-Total			99.0		%		80-120	04-MAY-18
Iron (Fe)-Total			93.9		%		80-120	04-MAY-18
Lead (Pb)-Total			95.9		%		80-120	04-MAY-18
Lithium (Li)-Total			95.8		%		80-120	04-MAY-18
Magnesium (Mg)-Total			98.8		%		80-120	04-MAY-18
Manganese (Mn)-Total			100.4		%		80-120	04-MAY-18
Molybdenum (Mo)-Total			103.1		%		80-120	04-MAY-18
Nickel (Ni)-Total			98.6		%		80-120	04-MAY-18
Potassium (K)-Total			100.6		%		80-120	04-MAY-18
Selenium (Se)-Total			99.3		%		80-120	04-MAY-18
Silicon (Si)-Total			100.8		%		80-120	04-MAY-18
Silver (Ag)-Total			100.4		%		80-120	04-MAY-18
Sodium (Na)-Total			101.8		%		80-120	04-MAY-18
Strontium (Sr)-Total			103.2		%		80-120	04-MAY-18
Thallium (Tl)-Total			94.0		%		80-120	04-MAY-18
Tin (Sn)-Total			98.1		%		80-120	04-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4033596								
WG2763477-2 LCS								
Titanium (Ti)-Total			96.1		%		80-120	04-MAY-18
Uranium (U)-Total			96.7		%		80-120	04-MAY-18
Vanadium (V)-Total			99.5		%		80-120	04-MAY-18
Zinc (Zn)-Total			96.7		%		80-120	04-MAY-18
WG2763477-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	04-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	04-MAY-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	04-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	04-MAY-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	04-MAY-18
Boron (B)-Total			<0.010		mg/L		0.01	04-MAY-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	04-MAY-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	04-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	04-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	04-MAY-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	04-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	04-MAY-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	04-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	04-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	04-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	04-MAY-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	04-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	04-MAY-18
Potassium (K)-Total			<0.050		mg/L		0.05	04-MAY-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	04-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	04-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	04-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	04-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	04-MAY-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	04-MAY-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	04-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	04-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	04-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	04-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4033596								
WG2763477-1 MB								
Zinc (Zn)-Total			<0.0030		mg/L		0.003	04-MAY-18
NH3-F-VA	**Water**							
Batch R4035742								
WG2766124-6 LCS								
Ammonia, Total (as N)			97.4		%		85-115	07-MAY-18
WG2766124-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	07-MAY-18
NO2-L-IC-N-VA	**Water**							
Batch R4026502								
WG2760834-2 LCS								
Nitrite (as N)			96.9		%		90-110	29-APR-18
WG2760834-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	29-APR-18
NO3-L-IC-N-VA	**Water**							
Batch R4026502								
WG2760834-2 LCS								
Nitrate (as N)			96.6		%		90-110	29-APR-18
WG2760834-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	29-APR-18
ORP-VA	**Water**							
Batch R4024954								
WG2760710-1 CRM		**VA-ORP**						
ORP			221		mV		210-230	28-APR-18
P-T-PRES-COL-VA	**Water**							
Batch R4025094								
WG2760732-34 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			98.6		%		80-120	29-APR-18
WG2760732-33 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	29-APR-18
WG2760732-36 MS		**L2086019-1**						
Phosphorus (P)-Total			105.2		%		70-130	29-APR-18
PO4-DO-COL-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-COL-VA	**Water**							
Batch R4024675								
WG2760585-14 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.3		%		80-120	28-APR-18
WG2760585-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	28-APR-18
SO4-IC-N-VA	**Water**							
Batch R4026502								
WG2760834-2 LCS								
Sulfate (SO4)			98.0		%		90-110	29-APR-18
WG2760834-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	29-APR-18
TDS-LOW-VA	**Water**							
Batch R4027808								
WG2760579-2 LCS								
Total Dissolved Solids			101.5		%		85-115	28-APR-18
WG2760579-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	28-APR-18
TKN-F-VA	**Water**							
Batch R4031118								
WG2762617-6 LCS								
Total Kjeldahl Nitrogen			102.5		%		75-125	02-MAY-18
WG2762617-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	02-MAY-18
TSS-LOW-VA	**Water**							
Batch R4032468								
WG2763146-4 LCS								
Total Suspended Solids			95.2		%		85-115	02-MAY-18
WG2763146-3 MB								
Total Suspended Solids			<1.0		mg/L		1	02-MAY-18
TURBIDITY-VA	**Water**							
Batch R4024659								
WG2760570-2 CRM		**VA-FORM-40**						
Turbidity			100.8		%		85-115	28-APR-18
WG2760570-1 MB								
Turbidity			<0.10		NTU		0.1	28-APR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	25-APR-18 11:02	28-APR-18 12:00	0.25	73	hours	EHTR-FM
pH by Meter (Automated)							
	1	25-APR-18 11:02	01-MAY-18 11:00	0.25	144	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	25-APR-18 11:02	29-APR-18 08:29	3	4	days	EHT
Nitrite in Water by IC (Low Level)							
	1	25-APR-18 11:02	29-APR-18 08:29	3	4	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2086019 were received on 27-APR-18 09:38.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	02-20_2018-04-25	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Lee Wilm			Lab Contact	Can Dang			Email 1:	lee.wilm@teck.com	X	X	X
Email	lee.wilm@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	PO Box 1777, 124B Aspen Drive			Address	8081 Lougheed Hwy			Email 3:	andrew.wight@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-865-5289			Phone Number	604-253-4188			PO number				

SAMPLE DETAILS — **ANALYSIS REQUESTED**

L2086019-COFC

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filtered (F/N)	F	N	F	N	F	N	N					
								Preserved	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3						
								Analysis	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-02-20_WP_Q2-2018_NP	RG_DW-02-20	WP		25-Apr-18	11:02	G	7		1	1	1	1	1	1	1					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	A. WIGHT	25 April 13:15	JC 10K	APR 27 2018 938 pm

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	**A.Wight**	**Mobile #**	**250-433-1159**
Sampler's Signature	A. Wight	**Date/Time**	**April 25, 2018** 13:15

Teck Coal Ltd.
ATTN: Lee Wilm
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 25-APR-18
Report Date: 07-MAY-18 16:26 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2084707

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 03-01_2018-04-23
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2084707-1				
	Description	WP				
	Sampled Date	23-APR-18				
	Sampled Time	14:55				
	Client ID	RG_DW-03-01_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	819				
	Hardness (as CaCO3) (mg/L)	418				
	pH (pH)	8.09				
	ORP (mV)	293				
	Total Suspended Solids (mg/L)	1.5				
	Total Dissolved Solids (mg/L)	498				
	Turbidity (NTU)	1.53				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	5.7				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	349				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	349				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.25 DLDS				
	Chloride (Cl) (mg/L)	40.3				
	Fluoride (F) (mg/L)	0.19				
	Nitrate (as N) (mg/L)	0.080				
	Nitrite (as N) (mg/L)	<0.0050 DLDS				
	Total Kjeldahl Nitrogen (mg/L)	<0.050				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	65.7				
	Anion Sum (meq/L)	9.50				
	Cation Sum (meq/L)	9.08				
	Cation - Anion Balance (%)	-2.3				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.04				
	Total Organic Carbon (mg/L)	0.97				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00012				
	Barium (Ba)-Total (mg/L)	0.131				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.035				
	Cadmium (Cd)-Total (ug/L)	0.0814				
	Calcium (Ca)-Total (mg/L)	116				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2084707-1				
	Description	WP				
	Sampled Date	23-APR-18				
	Sampled Time	14:55				
	Client ID	RG_DW-03-01_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010				
	Cobalt (Co)-Total (ug/L)	0.10				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	0.258				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	0.0220				
	Magnesium (Mg)-Total (mg/L)	36.2				
	Manganese (Mn)-Total (mg/L)	0.158				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00313				
	Nickel (Ni)-Total (mg/L)	0.00253				
	Potassium (K)-Total (mg/L)	2.18				
	Selenium (Se)-Total (ug/L)	0.169				
	Silicon (Si)-Total (mg/L)	4.71				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	14.8				
	Strontium (Sr)-Total (mg/L)	0.398				
	Thallium (Tl)-Total (mg/L)	0.000101				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.000972				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.135				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.032				
	Cadmium (Cd)-Dissolved (ug/L)	0.0795				
	Calcium (Ca)-Dissolved (mg/L)	108				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (ug/L)	0.10				
	Copper (Cu)-Dissolved (mg/L)	<0.00050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2084707-1				
	Description	WP				
	Sampled Date	23-APR-18				
	Sampled Time	14:55				
	Client ID	RG_DW-03-01_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	0.067				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0194				
	Magnesium (Mg)-Dissolved (mg/L)	35.8				
	Manganese (Mn)-Dissolved (mg/L)	0.152				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00308				
	Nickel (Ni)-Dissolved (mg/L)	0.00251				
	Potassium (K)-Dissolved (mg/L)	2.06				
	Selenium (Se)-Dissolved (ug/L)	0.193				
	Silicon (Si)-Dissolved (mg/L)	4.72				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	15.3				
	Strontium (Sr)-Dissolved (mg/L)	0.410				
	Thallium (Tl)-Dissolved (mg/L)	0.000110				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00100				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0026				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L2084707-1
Matrix Spike	Total Organic Carbon	MS-B	L2084707-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2084707-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2084707-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2084707-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2084707-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2084707-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2084707-1
Matrix Spike	Zinc (Zn)-Dissolved	MS-B	L2084707-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2084707-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2084707-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2084707-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2084707-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2084707-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

Reference Information

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

03-01_2018-04-23

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4024400								
WG2759210-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			108.7		%		85-115	27-APR-18
WG2759210-1 MB								
Acidity (as CaCO3)			1.8		mg/L		2	27-APR-18
ALK-TITR-VA	**Water**							
Batch R4026488								
WG2759213-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			113.2		%		85-115	28-APR-18
WG2759213-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	28-APR-18
BE-D-L-CCMS-VA	**Water**							
Batch R4031151								
WG2762666-2 LCS								
Beryllium (Be)-Dissolved			97.2		%		80-120	02-MAY-18
WG2762666-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	02-MAY-18
BE-T-L-CCMS-VA	**Water**							
Batch R4031003								
WG2761842-3 DUP		**L2084707-1**						
Beryllium (Be)-Total		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	02-MAY-18
WG2761842-2 LCS								
Beryllium (Be)-Total			109.1		%		80-120	02-MAY-18
WG2761842-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	02-MAY-18
BR-L-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Bromide (Br)			96.2		%		85-115	26-APR-18
WG2759163-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	26-APR-18
CARBONS-DOC-VA	**Water**							
Batch R4029767								
WG2761318-12 LCS								
Dissolved Organic Carbon			107.7		%		80-120	30-APR-18
WG2761318-4 LCS								
Dissolved Organic Carbon			109.0		%		80-120	30-APR-18
WG2761318-8 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4029767								
WG2761318-8 LCS								
Dissolved Organic Carbon			105.4		%		80-120	30-APR-18
WG2761318-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	30-APR-18
WG2761318-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	30-APR-18
WG2761318-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	30-APR-18
CARBONS-TOC-VA	**Water**							
Batch R4029652								
WG2761317-1 LCS								
Total Organic Carbon			104.3		%		80-120	30-APR-18
WG2761317-13 LCS								
Total Organic Carbon			105.1		%		80-120	30-APR-18
WG2761317-17 LCS								
Total Organic Carbon			103.6		%		80-120	30-APR-18
WG2761317-5 LCS								
Total Organic Carbon			104.5		%		80-120	30-APR-18
WG2761317-9 LCS								
Total Organic Carbon			104.8		%		80-120	30-APR-18
WG2761317-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-APR-18
WG2761317-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-APR-18
WG2761317-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-APR-18
WG2761317-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-APR-18
CL-L-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Chloride (Cl)			97.8		%		90-110	26-APR-18
WG2759163-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	26-APR-18
EC-PCT-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-PCT-VA	**Water**							
Batch R4024400								
WG2759210-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			99.0		%		90-110	27-APR-18
WG2759210-1 MB								
Conductivity			<2.0		uS/cm		2	27-APR-18
F-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Fluoride (F)			98.4		%		90-110	26-APR-18
WG2759163-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-APR-18
HG-D-CVAA-VA	**Water**							
Batch R4026245								
WG2759016-10 LCS								
Mercury (Hg)-Dissolved			80.6		%		80-120	29-APR-18
WG2759016-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	29-APR-18
HG-T-CVAA-VA	**Water**							
Batch R4023481								
WG2759234-35 DUP		**L2084707-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	26-APR-18
WG2759234-2 LCS								
Mercury (Hg)-Total			100.1		%		80-120	26-APR-18
WG2759234-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	26-APR-18
MET-D-CCMS-VA	**Water**							
Batch R4031151								
WG2762666-2 LCS								
Aluminum (Al)-Dissolved			100.8		%		80-120	02-MAY-18
Antimony (Sb)-Dissolved			97.0		%		80-120	02-MAY-18
Arsenic (As)-Dissolved			99.0		%		80-120	02-MAY-18
Barium (Ba)-Dissolved			99.6		%		80-120	02-MAY-18
Bismuth (Bi)-Dissolved			98.6		%		80-120	02-MAY-18
Boron (B)-Dissolved			90.9		%		80-120	02-MAY-18
Cadmium (Cd)-Dissolved			102.6		%		80-120	02-MAY-18
Calcium (Ca)-Dissolved			96.7		%		80-120	02-MAY-18
Chromium (Cr)-Dissolved			99.6		%		80-120	02-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4031151								
WG2762666-2 LCS								
Cobalt (Co)-Dissolved			97.7		%		80-120	02-MAY-18
Copper (Cu)-Dissolved			95.9		%		80-120	02-MAY-18
Iron (Fe)-Dissolved			101.3		%		80-120	02-MAY-18
Lead (Pb)-Dissolved			100.3		%		80-120	02-MAY-18
Lithium (Li)-Dissolved			95.0		%		80-120	02-MAY-18
Magnesium (Mg)-Dissolved			99.0		%		80-120	02-MAY-18
Manganese (Mn)-Dissolved			99.5		%		80-120	02-MAY-18
Molybdenum (Mo)-Dissolved			97.4		%		80-120	02-MAY-18
Nickel (Ni)-Dissolved			98.4		%		80-120	02-MAY-18
Potassium (K)-Dissolved			95.6		%		80-120	02-MAY-18
Selenium (Se)-Dissolved			99.8		%		80-120	02-MAY-18
Silicon (Si)-Dissolved			100.7		%		80-120	02-MAY-18
Silver (Ag)-Dissolved			91.2		%		80-120	02-MAY-18
Sodium (Na)-Dissolved			103.2		%		80-120	02-MAY-18
Strontium (Sr)-Dissolved			100.0		%		80-120	02-MAY-18
Thallium (Tl)-Dissolved			96.0		%		80-120	02-MAY-18
Tin (Sn)-Dissolved			96.6		%		80-120	02-MAY-18
Titanium (Ti)-Dissolved			95.2		%		80-120	02-MAY-18
Uranium (U)-Dissolved			98.3		%		80-120	02-MAY-18
Vanadium (V)-Dissolved			99.3		%		80-120	02-MAY-18
Zinc (Zn)-Dissolved			93.9		%		80-120	02-MAY-18
WG2762666-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	02-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	02-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	02-MAY-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	02-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	02-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	02-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	02-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4031151								
WG2762666-1 MB		**NP**						
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	02-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	02-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	02-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	02-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	02-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	02-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	02-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	02-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	02-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	02-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	02-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	02-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	02-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	02-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	02-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	02-MAY-18
MET-T-CCMS-VA	**Water**							
Batch R4031003								
WG2761842-3 DUP		**L2084707-1**						
Aluminum (Al)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	02-MAY-18
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-MAY-18
Arsenic (As)-Total		0.00012	0.00013		mg/L	7.3	20	02-MAY-18
Barium (Ba)-Total		0.131	0.130		mg/L	1.0	20	02-MAY-18
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-MAY-18
Boron (B)-Total		0.035	0.037		mg/L	3.3	20	02-MAY-18
Cadmium (Cd)-Total		0.0000814	0.0000762		mg/L	6.5	20	02-MAY-18
Calcium (Ca)-Total		116	116		mg/L	0.2	20	02-MAY-18
Chromium (Cr)-Total		<0.00010	0.00010	RPD-NA	mg/L	N/A	20	02-MAY-18
Cobalt (Co)-Total		0.00010	0.00012		mg/L	13	20	02-MAY-18
Copper (Cu)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-MAY-18
Iron (Fe)-Total		0.258	0.260		mg/L	0.7	20	02-MAY-18
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4031003								
WG2761842-3 DUP		**L2084707-1**						
Lithium (Li)-Total		0.0220	0.0237		mg/L	7.2	20	02-MAY-18
Magnesium (Mg)-Total		36.2	36.1		mg/L	0.1	20	02-MAY-18
Manganese (Mn)-Total		0.158	0.159		mg/L	1.0	20	02-MAY-18
Molybdenum (Mo)-Total		0.00313	0.00315		mg/L	0.6	20	02-MAY-18
Nickel (Ni)-Total		0.00253	0.00255		mg/L	0.8	20	02-MAY-18
Potassium (K)-Total		2.18	2.10		mg/L	3.4	20	02-MAY-18
Selenium (Se)-Total		0.000169	0.000187		mg/L	10	20	02-MAY-18
Silicon (Si)-Total		4.71	5.01		mg/L	6.0	20	02-MAY-18
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-MAY-18
Sodium (Na)-Total		14.8	14.6		mg/L	1.3	20	02-MAY-18
Strontium (Sr)-Total		0.398	0.406		mg/L	2.0	20	02-MAY-18
Thallium (Tl)-Total		0.000101	0.000104		mg/L	3.3	20	02-MAY-18
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-MAY-18
Titanium (Ti)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-MAY-18
Uranium (U)-Total		0.000972	0.000962		mg/L	1.0	20	02-MAY-18
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-MAY-18
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	02-MAY-18
WG2761842-2 LCS								
Aluminum (Al)-Total			111.4		%		80-120	02-MAY-18
Antimony (Sb)-Total			100.1		%		80-120	02-MAY-18
Arsenic (As)-Total			102.7		%		80-120	02-MAY-18
Barium (Ba)-Total			109.0		%		80-120	02-MAY-18
Bismuth (Bi)-Total			93.2		%		80-120	02-MAY-18
Boron (B)-Total			111.7		%		80-120	02-MAY-18
Cadmium (Cd)-Total			100.0		%		80-120	02-MAY-18
Calcium (Ca)-Total			109.6		%		80-120	02-MAY-18
Chromium (Cr)-Total			100.8		%		80-120	02-MAY-18
Cobalt (Co)-Total			102.0		%		80-120	02-MAY-18
Copper (Cu)-Total			101.0		%		80-120	02-MAY-18
Iron (Fe)-Total			99.99		%		80-120	02-MAY-18
Lead (Pb)-Total			91.6		%		80-120	02-MAY-18
Lithium (Li)-Total			116.9		%		80-120	02-MAY-18
Magnesium (Mg)-Total			111.1		%		80-120	02-MAY-18
Manganese (Mn)-Total			102.0		%		80-120	02-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4031003								
WG2761842-2 LCS								
Molybdenum (Mo)-Total			103.3		%		80-120	02-MAY-18
Nickel (Ni)-Total			101.2		%		80-120	02-MAY-18
Potassium (K)-Total			111.7		%		80-120	02-MAY-18
Selenium (Se)-Total			102.6		%		80-120	02-MAY-18
Silicon (Si)-Total			101.0		%		80-120	02-MAY-18
Silver (Ag)-Total			96.0		%		80-120	02-MAY-18
Sodium (Na)-Total			104.7		%		80-120	02-MAY-18
Strontium (Sr)-Total			98.3		%		80-120	02-MAY-18
Thallium (Tl)-Total			95.3		%		80-120	02-MAY-18
Tin (Sn)-Total			97.8		%		80-120	02-MAY-18
Titanium (Ti)-Total			99.0		%		80-120	02-MAY-18
Uranium (U)-Total			90.7		%		80-120	02-MAY-18
Vanadium (V)-Total			105.8		%		80-120	02-MAY-18
Zinc (Zn)-Total			99.4		%		80-120	02-MAY-18
WG2761842-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	02-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	02-MAY-18
Boron (B)-Total			<0.010		mg/L		0.01	02-MAY-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	02-MAY-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	02-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	02-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	02-MAY-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	02-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	02-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	02-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	02-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	02-MAY-18
Potassium (K)-Total			<0.050		mg/L		0.05	02-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4031003								
WG2761842-1 MB								
Selenium (Se)-Total			<0.000050		mg/L		0.00005	02-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	02-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	02-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	02-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	02-MAY-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	02-MAY-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	02-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	02-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	02-MAY-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	02-MAY-18
NH3-F-VA	**Water**							
Batch R4033587								
WG2763945-6 LCS								
Ammonia, Total (as N)			101.5		%		85-115	05-MAY-18
WG2763945-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	05-MAY-18
NO2-L-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Nitrite (as N)			97.8		%		90-110	26-APR-18
WG2759163-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-APR-18
NO3-L-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Nitrate (as N)			98.4		%		90-110	26-APR-18
WG2759163-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-APR-18
ORP-VA	**Water**							
Batch R4023943								
WG2759678-1 CRM		**VA-ORP**						
ORP			221		mV		210-230	26-APR-18
P-T-PRES-COL-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-PRES-COL-VA	**Water**							
Batch R4024243								
WG2759216-6 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			105.1		%		80-120	27-APR-18
WG2759216-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	27-APR-18
PH-PCT-VA	**Water**							
Batch R4024400								
WG2759210-2 CRM		**VA-PH7-BUF**						
pH			7.06		pH		6.9-7.1	27-APR-18
PO4-DO-COL-VA	**Water**							
Batch R4023165								
WG2758834-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			100.7		%		80-120	26-APR-18
WG2758834-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	26-APR-18
SO4-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Sulfate (SO4)			99.5		%		90-110	26-APR-18
WG2759163-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	26-APR-18
TDS-LOW-VA	**Water**							
Batch R4027808								
WG2760579-2 LCS								
Total Dissolved Solids			101.5		%		85-115	28-APR-18
WG2760579-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	28-APR-18
TKN-F-VA	**Water**							
Batch R4026236								
WG2760428-6 LCS								
Total Kjeldahl Nitrogen			103.6		%		75-125	29-APR-18
WG2760428-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	29-APR-18
TSS-LOW-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-LOW-VA	**Water**							
Batch R4028949								
WG2761821-2 LCS								
Total Suspended Solids			103.2		%		85-115	30-APR-18
WG2761821-1 MB								
Total Suspended Solids			<1.0		mg/L		1	30-APR-18
TURBIDITY-VA	**Water**							
Batch R4023843								
WG2759398-2 CRM		**VA-FORM-40**						
Turbidity			99.8		%		85-115	26-APR-18
WG2759398-5 CRM		**VA-FORM-40**						
Turbidity			101.3		%		85-115	26-APR-18
WG2759398-1 MB								
Turbidity			<0.10		NTU		0.1	26-APR-18
WG2759398-4 MB								
Turbidity			<0.10		NTU		0.1	26-APR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	23-APR-18 14:55	26-APR-18 21:30	0.25	78	hours	EHTR-FM
pH by Meter (Automated)							
	1	23-APR-18 14:55	27-APR-18 11:00	0.25	92	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2084707 were received on 25-APR-18 11:50.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	03-01_2018-04-23	TURNAROUND TIME:		RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Lee Wilm			Lab Contact	Can Dang			Email 1:	lee.wilm@teck.com	X	X	X
Email	lee.wilm@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	PO Box 1777, 124B Aspen Drive			Address	8081 Lougheed Hwy			Email 3:	andrew.wight@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-865-5289			Phone Number	604-253-4188			PO number				

L2084707-COFC

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA
								F	N	F	N	F	N	N
								H2SO4	H2SO4	HCL	HCL	HNO3	HNO3	
RG_DW-03-01_WP_Q2-2018_NP	RG_DW-03-01	WP		23-Apr-18	1455	G	7	1	1	1	1	1	1	1

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			JC 8°C Z1	APR 25 2018 1150am

SERVICE REQUEST (rush - subject to availability)	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	A.Wight	Mobile #	250-433-1159
Sampler's Signature	A. Wight	Date/Time	April 23, 2018 1520

Teck Coal Ltd.
ATTN: Lee Wilm
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 02-MAY-18
Report Date: 11-MAY-18 16:45 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2088164

Project P.O. #: VPO00563596
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 03-04_2018-04-30
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2088164-1				
	Description	WP				
	Sampled Date	30-APR-18				
	Sampled Time	11:30				
	Client ID	RG_DW-03-04_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	637				
	Hardness (as CaCO3) (mg/L)	335				
	pH (pH)	8.41				
	ORP (mV)	307				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	424				
	Turbidity (NTU)	0.11				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	173				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	6.4				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	179				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	15.3				
	Fluoride (F) (mg/L)	0.136				
	Nitrate (as N) (mg/L)	2.24				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.183 TKNI				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0024				
	Phosphorus (P)-Total (mg/L)	0.0048				
	Sulfate (SO4) (mg/L)	122				
	Anion Sum (meq/L)	6.73				
	Cation Sum (meq/L)	7.06				
	Cation - Anion Balance (%)	2.4				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.64				
	Total Organic Carbon (mg/L)	0.82				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	0.00012				
	Arsenic (As)-Total (mg/L)	0.00016				
	Barium (Ba)-Total (mg/L)	0.187				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (ug/L)	0.0175				
	Calcium (Ca)-Total (mg/L)	86.7				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2088164-1				
	Description	WP				
	Sampled Date	30-APR-18				
	Sampled Time	11:30				
	Client ID	RG_DW-03-04_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00017				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	0.0088				
	Magnesium (Mg)-Total (mg/L)	28.1				
	Manganese (Mn)-Total (mg/L)	0.00040				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00101				
	Nickel (Ni)-Total (mg/L)	0.00057				
	Potassium (K)-Total (mg/L)	0.962				
	Selenium (Se)-Total (ug/L)	14.3				
	Silicon (Si)-Total (mg/L)	2.50				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	7.43				
	Strontium (Sr)-Total (mg/L)	0.197				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00108				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0037				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.183				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (ug/L)	0.0204				
	Calcium (Ca)-Dissolved (mg/L)	86.7				
	Chromium (Cr)-Dissolved (mg/L)	0.00012				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	<0.00050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2088164-1				
	Description	WP				
	Sampled Date	30-APR-18				
	Sampled Time	11:30				
	Client ID	RG_DW-03-04_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0096				
	Magnesium (Mg)-Dissolved (mg/L)	28.8				
	Manganese (Mn)-Dissolved (mg/L)	0.00028				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000966				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	1.06				
	Selenium (Se)-Dissolved (ug/L)	13.9				
	Silicon (Si)-Dissolved (mg/L)	2.43				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	7.67				
	Strontium (Sr)-Dissolved (mg/L)	0.195				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00105				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0047				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Acidity (as CaCO3)	B	L2088164-1
Matrix Spike	Dissolved Organic Carbon	MS-B	L2088164-1
Matrix Spike	Dissolved Organic Carbon	MS-B	L2088164-1
Matrix Spike	Total Organic Carbon	MS-B	L2088164-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2088164-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2088164-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2088164-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2088164-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Reference Information

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Reference Information

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

03-04_2018-04-30

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4036549								
WG2765418-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			107.7		%		85-115	07-MAY-18
WG2765418-5 DUP		**L2088164-1**						
Acidity (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	07-MAY-18
WG2765418-1 MB								
Acidity (as CaCO3)			2.1	B	mg/L		2	07-MAY-18
ALK-TITR-VA	**Water**							
Batch R4038693								
WG2765420-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			99.8		%		85-115	09-MAY-18
WG2765420-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	09-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4038472								
WG2766525-2 LCS								
Beryllium (Be)-Dissolved			98.2		%		80-120	08-MAY-18
WG2766525-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	08-MAY-18
BE-T-L-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-2 LCS								
Beryllium (Be)-Total			107.2		%		80-120	08-MAY-18
WG2765762-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	08-MAY-18
BR-L-IC-N-VA	**Water**							
Batch R4039246								
WG2765423-2 LCS								
Bromide (Br)			94.5		%		85-115	05-MAY-18
WG2765423-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	05-MAY-18
CARBONS-DOC-VA	**Water**							
Batch R4036087								
WG2766291-9 DUP		**L2088164-1**						
Dissolved Organic Carbon		0.64	0.58		mg/L	8.8	20	07-MAY-18
WG2766291-12 LCS								
Dissolved Organic Carbon			100.5		%		80-120	07-MAY-18
WG2766291-16 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4036087								
WG2766291-16 LCS								
Dissolved Organic Carbon			97.7		%		80-120	07-MAY-18
WG2766291-4 LCS								
Dissolved Organic Carbon			98.6		%		80-120	07-MAY-18
WG2766291-8 LCS								
Dissolved Organic Carbon			98.2		%		80-120	07-MAY-18
WG2766291-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766291-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766291-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766291-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
CARBONS-TOC-VA	**Water**							
Batch R4036088								
WG2766290-10 DUP		**L2088164-1**						
Total Organic Carbon		0.82	1.20	J	mg/L	0.38	1	07-MAY-18
WG2766290-1 LCS								
Total Organic Carbon			97.8		%		80-120	07-MAY-18
WG2766290-13 LCS								
Total Organic Carbon			98.2		%		80-120	07-MAY-18
WG2766290-17 LCS								
Total Organic Carbon			97.3		%		80-120	07-MAY-18
WG2766290-5 LCS								
Total Organic Carbon			97.8		%		80-120	07-MAY-18
WG2766290-9 LCS								
Total Organic Carbon			98.9		%		80-120	07-MAY-18
WG2766290-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766290-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766290-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
WG2766290-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-MAY-18
CL-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-L-IC-N-VA	**Water**							
Batch R4039246								
WG2765423-2 LCS								
Chloride (Cl)			91.8		%		90-110	05-MAY-18
WG2765423-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	05-MAY-18
EC-PCT-VA	**Water**							
Batch R4036549								
WG2765418-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			103.9		%		90-110	07-MAY-18
WG2765418-5 DUP		**L2088164-1**						
Conductivity		637	644		uS/cm	1.1	10	07-MAY-18
WG2765418-1 MB								
Conductivity			<2.0		uS/cm		2	07-MAY-18
F-IC-N-VA	**Water**							
Batch R4039246								
WG2765423-2 LCS								
Fluoride (F)			90.1		%		90-110	05-MAY-18
WG2765423-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	05-MAY-18
HG-D-CVAA-VA	**Water**							
Batch R4033477								
WG2765023-6 LCS								
Mercury (Hg)-Dissolved			103.4		%		80-120	04-MAY-18
WG2765023-5 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	04-MAY-18
WG2765023-8 MS		**L2088164-1**						
Mercury (Hg)-Dissolved			100.4		%		70-130	04-MAY-18
HG-T-CVAA-VA	**Water**							
Batch R4032708								
WG2764368-2 LCS								
Mercury (Hg)-Total			100.0		%		80-120	03-MAY-18
WG2764368-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	03-MAY-18
MET-D-CCMS-VA	**Water**							
Batch R4038472								
WG2766525-2 LCS								
Aluminum (Al)-Dissolved			102.0		%		80-120	08-MAY-18
Antimony (Sb)-Dissolved			101.3		%		80-120	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4038472								
WG2766525-2 LCS								
Arsenic (As)-Dissolved			96.5		%		80-120	08-MAY-18
Barium (Ba)-Dissolved			92.7		%		80-120	08-MAY-18
Bismuth (Bi)-Dissolved			95.1		%		80-120	08-MAY-18
Boron (B)-Dissolved			88.8		%		80-120	08-MAY-18
Cadmium (Cd)-Dissolved			96.9		%		80-120	08-MAY-18
Calcium (Ca)-Dissolved			97.1		%		80-120	08-MAY-18
Chromium (Cr)-Dissolved			98.8		%		80-120	08-MAY-18
Cobalt (Co)-Dissolved			95.5		%		80-120	08-MAY-18
Copper (Cu)-Dissolved			97.6		%		80-120	08-MAY-18
Iron (Fe)-Dissolved			94.7		%		80-120	08-MAY-18
Lead (Pb)-Dissolved			97.5		%		80-120	08-MAY-18
Lithium (Li)-Dissolved			100.6		%		80-120	08-MAY-18
Magnesium (Mg)-Dissolved			107.7		%		80-120	08-MAY-18
Manganese (Mn)-Dissolved			96.1		%		80-120	08-MAY-18
Molybdenum (Mo)-Dissolved			98.9		%		80-120	08-MAY-18
Nickel (Ni)-Dissolved			96.6		%		80-120	08-MAY-18
Potassium (K)-Dissolved			100.7		%		80-120	08-MAY-18
Selenium (Se)-Dissolved			96.6		%		80-120	08-MAY-18
Silicon (Si)-Dissolved			96.1		%		80-120	08-MAY-18
Silver (Ag)-Dissolved			101.5		%		80-120	08-MAY-18
Sodium (Na)-Dissolved			103.3		%		80-120	08-MAY-18
Strontium (Sr)-Dissolved			105.7		%		80-120	08-MAY-18
Thallium (Tl)-Dissolved			99.5		%		80-120	08-MAY-18
Tin (Sn)-Dissolved			98.6		%		80-120	08-MAY-18
Titanium (Ti)-Dissolved			98.0		%		80-120	08-MAY-18
Uranium (U)-Dissolved			93.4		%		80-120	08-MAY-18
Vanadium (V)-Dissolved			100.0		%		80-120	08-MAY-18
Zinc (Zn)-Dissolved			95.4		%		80-120	08-MAY-18
WG2766525-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4038472								
WG2766525-1 MB		**NP**						
Boron (B)-Dissolved			<0.010		mg/L		0.01	08-MAY-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	08-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	08-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	08-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	08-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	08-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	08-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	08-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	08-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18
Batch R4039365								
WG2766525-1 MB		**NP**						
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	09-MAY-18
MET-T-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-2 LCS								
Aluminum (Al)-Total			105.2		%		80-120	08-MAY-18
Antimony (Sb)-Total			104.8		%		80-120	08-MAY-18
Arsenic (As)-Total			103.3		%		80-120	08-MAY-18
Barium (Ba)-Total			104.9		%		80-120	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-2 LCS								
Bismuth (Bi)-Total			99.9		%		80-120	08-MAY-18
Boron (B)-Total			88.5		%		80-120	08-MAY-18
Cadmium (Cd)-Total			103.8		%		80-120	08-MAY-18
Calcium (Ca)-Total			102.0		%		80-120	08-MAY-18
Chromium (Cr)-Total			98.5		%		80-120	08-MAY-18
Cobalt (Co)-Total			102.4		%		80-120	08-MAY-18
Copper (Cu)-Total			103.7		%		80-120	08-MAY-18
Iron (Fe)-Total			100.1		%		80-120	08-MAY-18
Lead (Pb)-Total			101.2		%		80-120	08-MAY-18
Lithium (Li)-Total			103.2		%		80-120	08-MAY-18
Magnesium (Mg)-Total			103.9		%		80-120	08-MAY-18
Manganese (Mn)-Total			106.0		%		80-120	08-MAY-18
Molybdenum (Mo)-Total			103.9		%		80-120	08-MAY-18
Nickel (Ni)-Total			103.9		%		80-120	08-MAY-18
Potassium (K)-Total			105.9		%		80-120	08-MAY-18
Selenium (Se)-Total			111.9		%		80-120	08-MAY-18
Silicon (Si)-Total			107.9		%		80-120	08-MAY-18
Silver (Ag)-Total			105.6		%		80-120	08-MAY-18
Sodium (Na)-Total			105.1		%		80-120	08-MAY-18
Strontium (Sr)-Total			101.5		%		80-120	08-MAY-18
Thallium (Tl)-Total			100.7		%		80-120	08-MAY-18
Tin (Sn)-Total			101.5		%		80-120	08-MAY-18
Titanium (Ti)-Total			103.5		%		80-120	08-MAY-18
Uranium (U)-Total			100.8		%		80-120	08-MAY-18
Vanadium (V)-Total			105.3		%		80-120	08-MAY-18
Zinc (Zn)-Total			101.2		%		80-120	08-MAY-18
WG2765762-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	08-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	08-MAY-18
Boron (B)-Total			<0.010		mg/L		0.01	08-MAY-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4038654								
WG2765762-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	08-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	08-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	08-MAY-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	08-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	08-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	08-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	08-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	08-MAY-18
Potassium (K)-Total			<0.050		mg/L		0.05	08-MAY-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	08-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	08-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	08-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	08-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	08-MAY-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	08-MAY-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	08-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	08-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	08-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	08-MAY-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	08-MAY-18
NH3-F-VA	**Water**							
Batch R4039351								
WG2767883-6 LCS								
Ammonia, Total (as N)			99.6		%		85-115	09-MAY-18
WG2767883-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	09-MAY-18
NO2-L-IC-N-VA	**Water**							
Batch R4039246								
WG2765423-2 LCS								
Nitrite (as N)			90.1		%		90-110	05-MAY-18
WG2765423-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	05-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-VA	**Water**							
Batch R4039246								
WG2765423-2 LCS								
Nitrate (as N)			91.2		%		90-110	05-MAY-18
WG2765423-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	05-MAY-18
ORP-VA	**Water**							
Batch R4033768								
WG2765565-1 CRM		**VA-ORP**						
ORP			220		mV		210-230	05-MAY-18
WG2765565-2 DUP		**L2088164-1**						
ORP		307	309	J	mV	2.2	15	05-MAY-18
P-T-PRES-COL-VA	**Water**							
Batch R4033255								
WG2764244-10 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			94.4		%		80-120	04-MAY-18
WG2764244-9 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	04-MAY-18
PH-PCT-VA	**Water**							
Batch R4036549								
WG2765418-2 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	07-MAY-18
WG2765418-5 DUP		**L2088164-1**						
pH		8.41	8.46	J	pH	0.05	0.3	07-MAY-18
PO4-DO-COL-VA	**Water**							
Batch R4031186								
WG2763590-18 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.8		%		80-120	02-MAY-18
WG2763590-17 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAY-18
SO4-IC-N-VA	**Water**							
Batch R4039246								
WG2765423-2 LCS								
Sulfate (SO4)			93.8		%		90-110	05-MAY-18
WG2765423-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	05-MAY-18
TDS-LOW-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TDS-LOW-VA	**Water**							
Batch R4037942								
WG2766491-2 LCS								
Total Dissolved Solids			98.4		%		85-115	07-MAY-18
WG2766491-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	07-MAY-18
TKN-F-VA	**Water**							
Batch R4033711								
WG2764322-7 DUP		**L2088164-1**						
Total Kjeldahl Nitrogen		0.183	0.144	J	mg/L	0.039	0.1	05-MAY-18
WG2764322-6 LCS								
Total Kjeldahl Nitrogen			101.1		%		75-125	05-MAY-18
WG2764322-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	05-MAY-18
TSS-LOW-VA	**Water**							
Batch R4036050								
WG2765581-4 LCS								
Total Suspended Solids			101.3		%		85-115	05-MAY-18
WG2765581-3 MB								
Total Suspended Solids			<1.0		mg/L		1	05-MAY-18
TURBIDITY-VA	**Water**							
Batch R4032660								
WG2764218-2 CRM		**VA-FORM-40**						
Turbidity			101.0		%		85-115	03-MAY-18
WG2764218-5 CRM		**VA-FORM-40**						
Turbidity			99.8		%		85-115	03-MAY-18
WG2764218-1 MB								
Turbidity			<0.10		NTU		0.1	03-MAY-18
WG2764218-4 MB								
Turbidity			<0.10		NTU		0.1	03-MAY-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	30-APR-18 11:30	05-MAY-18 13:00	0.25	121	hours	EHTR-FM
pH by Meter (Automated)							
	1	30-APR-18 11:30	07-MAY-18 20:30	0.25	177	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	30-APR-18 11:30	05-MAY-18 09:07	3	5	days	EHTL
Nitrite in Water by IC (Low Level)							
	1	30-APR-18 11:30	05-MAY-18 09:07	3	5	days	EHTL

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2088164 were received on 02-MAY-18 13:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	03-04_2018-04-30	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program		
Project Manager	Lee Wilm		
Email	lee.wilm@teck.com		
Address	PO Box 1777, 124B Aspen Drive		
City	Sparwood	Province	BC
Postal Code	V0B 2G0	Country	Canada
Phone Number	250-865-5289		

LABORATORY

Lab Name	ALS Burnaby		
Lab Contact	Can Dang		
Email	can.dang@alsglobal.com		
Address	8081 Lougheed Hwy		
City	Burnaby	Province	BC
Postal Code	V5A 1W9	Country	Canada
Phone Number	604-253-4188		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	lee.wilm@teck.com	X	X	X
Email 2:	carla.fraser@teck.com	X	X	X
Email 3:	andrew.wight@teck.com	X	X	X
Email 4:	teckcoal@equisonline.com			X
Email 5:	cait.good@teck.com	X	X	X

PO number

SAMPLE DETAILS

L2088164-COFC

ANALYSIS REQUESTED

Filtered - F; Field, L; Lab, FiL; Field & Lab, N; None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	F	N	F	N	F	N	N					
								PRESERV.	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3						
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-03-04_WP_Q2-2018_NP	RG_DW-03-04	WP	N	30-Apr-18	1130	G	7		1	1	1	1	1	1	1					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
A. WIGHT	30 Apr '18 1545	JL ZI SL	MAY - 2 2018 13:10

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	A.Wight	Mobile #	250-433-1159
Sampler's Signature	A. Wight	Date/Time	April 30, 2018 1545

Teck Coal Ltd.
ATTN: Lee Wilm
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 25-APR-18
Report Date: 07-MAY-18 16:31 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2084710

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 07-01_2018-04-23
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2084710-1				
	Description	WP				
	Sampled Date	23-APR-18				
	Sampled Time	13:35				
	Client ID	RG_DW-07-01_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	1320				
	Hardness (as CaCO3) (mg/L)	696				
	pH (pH)	8.13				
	ORP (mV)	302				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	960				
	Turbidity (NTU)	2.01				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	3.8				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	275				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	11.4				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	286				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.25 DLDS				
	Chloride (Cl) (mg/L)	25.6				
	Fluoride (F) (mg/L)	0.14				
	Nitrate (as N) (mg/L)	0.913				
	Nitrite (as N) (mg/L)	<0.0050 DLDS				
	Total Kjeldahl Nitrogen (mg/L)	0.161				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0013				
	Phosphorus (P)-Total (mg/L)	0.0030				
	Sulfate (SO4) (mg/L)	446				
	Anion Sum (meq/L)	15.8				
	Cation Sum (meq/L)	15.5				
	Cation - Anion Balance (%)	-0.9				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.14				
	Total Organic Carbon (mg/L)	1.17				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	0.00017				
	Arsenic (As)-Total (mg/L)	0.00015				
	Barium (Ba)-Total (mg/L)	0.0712				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.044				
	Cadmium (Cd)-Total (ug/L)	0.0253				
	Calcium (Ca)-Total (mg/L)	171				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2084710-1				
	Description	WP				
	Sampled Date	23-APR-18				
	Sampled Time	13:35				
	Client ID	RG_DW-07-01_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.0100				
	Iron (Fe)-Total (mg/L)	0.258				
	Lead (Pb)-Total (mg/L)	0.000125				
	Lithium (Li)-Total (mg/L)	0.0212				
	Magnesium (Mg)-Total (mg/L)	72.7				
	Manganese (Mn)-Total (mg/L)	0.00365				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.000682				
	Nickel (Ni)-Total (mg/L)	0.00069				
	Potassium (K)-Total (mg/L)	2.11				
	Selenium (Se)-Total (ug/L)	3.09				
	Silicon (Si)-Total (mg/L)	2.30				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	35.1				
	Strontium (Sr)-Total (mg/L)	0.446				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00230				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0248				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	0.00015				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.0754				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.038				
	Cadmium (Cd)-Dissolved (ug/L)	0.0310				
	Calcium (Ca)-Dissolved (mg/L)	161				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00762				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2084710-1				
	Description	WP				
	Sampled Date	23-APR-18				
	Sampled Time	13:35				
	Client ID	RG_DW-07-01_WP_Q2-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0189				
	Magnesium (Mg)-Dissolved (mg/L)	71.4				
	Manganese (Mn)-Dissolved (mg/L)	0.00365				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000700				
	Nickel (Ni)-Dissolved (mg/L)	0.00077				
	Potassium (K)-Dissolved (mg/L)	2.02				
	Selenium (Se)-Dissolved (ug/L)	3.40				
	Silicon (Si)-Dissolved (mg/L)	2.16				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	35.7				
	Strontium (Sr)-Dissolved (mg/L)	0.469				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00235				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0227				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L2084710-1
Matrix Spike	Total Organic Carbon	MS-B	L2084710-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2084710-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2084710-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2084710-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2084710-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2084710-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2084710-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2084710-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2084710-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2084710-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2084710-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Reference Information

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

07-01_2018-04-23

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4024400								
WG2759210-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			108.7		%		85-115	27-APR-18
WG2759210-1 MB								
Acidity (as CaCO3)			1.8		mg/L		2	27-APR-18
ALK-TITR-VA	**Water**							
Batch R4026488								
WG2759213-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			113.2		%		85-115	28-APR-18
WG2759213-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	28-APR-18
BE-D-L-CCMS-VA	**Water**							
Batch R4031151								
WG2762651-2 LCS								
Beryllium (Be)-Dissolved			92.1		%		80-120	02-MAY-18
WG2762651-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	02-MAY-18
BE-T-L-CCMS-VA	**Water**							
Batch R4031003								
WG2761842-2 LCS								
Beryllium (Be)-Total			109.1		%		80-120	02-MAY-18
WG2761842-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	02-MAY-18
BR-L-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Bromide (Br)			96.2		%		85-115	26-APR-18
WG2759163-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	26-APR-18
CARBONS-DOC-VA	**Water**							
Batch R4029767								
WG2761318-12 LCS								
Dissolved Organic Carbon			107.7		%		80-120	30-APR-18
WG2761318-4 LCS								
Dissolved Organic Carbon			109.0		%		80-120	30-APR-18
WG2761318-8 LCS								
Dissolved Organic Carbon			105.4		%		80-120	30-APR-18
WG2761318-11 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4029767								
WG2761318-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	30-APR-18
WG2761318-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	30-APR-18
WG2761318-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	30-APR-18
CARBONS-TOC-VA	**Water**							
Batch R4029652								
WG2761317-1 LCS								
Total Organic Carbon			104.3		%		80-120	30-APR-18
WG2761317-13 LCS								
Total Organic Carbon			105.1		%		80-120	30-APR-18
WG2761317-17 LCS								
Total Organic Carbon			103.6		%		80-120	30-APR-18
WG2761317-5 LCS								
Total Organic Carbon			104.5		%		80-120	30-APR-18
WG2761317-9 LCS								
Total Organic Carbon			104.8		%		80-120	30-APR-18
WG2761317-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-APR-18
WG2761317-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-APR-18
WG2761317-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-APR-18
WG2761317-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-APR-18
CL-L-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Chloride (Cl)			97.8		%		90-110	26-APR-18
WG2759163-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	26-APR-18
EC-PCT-VA	**Water**							
Batch R4024400								
WG2759210-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			99.0		%		90-110	27-APR-18
WG2759210-1 MB								
Conductivity			<2.0		uS/cm		2	27-APR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Fluoride (F)			98.4		%		90-110	26-APR-18
WG2759163-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-APR-18
HG-D-CVAA-VA	**Water**							
Batch R4026245								
WG2759016-10 LCS								
Mercury (Hg)-Dissolved			80.6		%		80-120	29-APR-18
WG2759016-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005		mg/L		0.000005	29-APR-18
HG-T-CVAA-VA	**Water**							
Batch R4023481								
WG2759234-2 LCS								
Mercury (Hg)-Total			100.1		%		80-120	26-APR-18
WG2759234-1 MB								
Mercury (Hg)-Total			<0.000005		mg/L		0.000005	26-APR-18
MET-D-CCMS-VA	**Water**							
Batch R4031151								
WG2762651-2 LCS								
Aluminum (Al)-Dissolved			104.6		%		80-120	02-MAY-18
Antimony (Sb)-Dissolved			99.3		%		80-120	02-MAY-18
Arsenic (As)-Dissolved			104.8		%		80-120	02-MAY-18
Barium (Ba)-Dissolved			104.8		%		80-120	02-MAY-18
Bismuth (Bi)-Dissolved			101.5		%		80-120	02-MAY-18
Boron (B)-Dissolved			86.8		%		80-120	02-MAY-18
Cadmium (Cd)-Dissolved			105.0		%		80-120	02-MAY-18
Calcium (Ca)-Dissolved			95.9		%		80-120	02-MAY-18
Chromium (Cr)-Dissolved			99.4		%		80-120	02-MAY-18
Cobalt (Co)-Dissolved			101.0		%		80-120	02-MAY-18
Copper (Cu)-Dissolved			100.6		%		80-120	02-MAY-18
Iron (Fe)-Dissolved			98.3		%		80-120	02-MAY-18
Lead (Pb)-Dissolved			103.5		%		80-120	02-MAY-18
Lithium (Li)-Dissolved			90.1		%		80-120	02-MAY-18
Magnesium (Mg)-Dissolved			104.2		%		80-120	02-MAY-18
Manganese (Mn)-Dissolved			100.1		%		80-120	02-MAY-18
Molybdenum (Mo)-Dissolved			101.5		%		80-120	02-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4031151								
WG2762651-2 LCS								
Nickel (Ni)-Dissolved			103.4		%		80-120	02-MAY-18
Potassium (K)-Dissolved			99.2		%		80-120	02-MAY-18
Selenium (Se)-Dissolved			100.9		%		80-120	02-MAY-18
Silicon (Si)-Dissolved			99.8		%		80-120	02-MAY-18
Silver (Ag)-Dissolved			93.3		%		80-120	02-MAY-18
Sodium (Na)-Dissolved			106.0		%		80-120	02-MAY-18
Strontium (Sr)-Dissolved			104.5		%		80-120	02-MAY-18
Thallium (Tl)-Dissolved			100.5		%		80-120	02-MAY-18
Tin (Sn)-Dissolved			99.8		%		80-120	02-MAY-18
Titanium (Ti)-Dissolved			102.8		%		80-120	02-MAY-18
Uranium (U)-Dissolved			102.0		%		80-120	02-MAY-18
Vanadium (V)-Dissolved			103.3		%		80-120	02-MAY-18
Zinc (Zn)-Dissolved			98.2		%		80-120	02-MAY-18
WG2762651-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	02-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	02-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	02-MAY-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	02-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	02-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	02-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	02-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	02-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	02-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	02-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	02-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	02-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	02-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	02-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4031151								
WG2762651-1 MB		**NP**						
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	02-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	02-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	02-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	02-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	02-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	02-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	02-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	02-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	02-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	02-MAY-18
MET-T-CCMS-VA	**Water**							
Batch R4031003								
WG2761842-2 LCS								
Aluminum (Al)-Total			111.4		%		80-120	02-MAY-18
Antimony (Sb)-Total			100.1		%		80-120	02-MAY-18
Arsenic (As)-Total			102.7		%		80-120	02-MAY-18
Barium (Ba)-Total			109.0		%		80-120	02-MAY-18
Bismuth (Bi)-Total			93.2		%		80-120	02-MAY-18
Boron (B)-Total			111.7		%		80-120	02-MAY-18
Cadmium (Cd)-Total			100.0		%		80-120	02-MAY-18
Calcium (Ca)-Total			109.6		%		80-120	02-MAY-18
Chromium (Cr)-Total			100.8		%		80-120	02-MAY-18
Cobalt (Co)-Total			102.0		%		80-120	02-MAY-18
Copper (Cu)-Total			101.0		%		80-120	02-MAY-18
Iron (Fe)-Total			99.99		%		80-120	02-MAY-18
Lead (Pb)-Total			91.6		%		80-120	02-MAY-18
Lithium (Li)-Total			116.9		%		80-120	02-MAY-18
Magnesium (Mg)-Total			111.1		%		80-120	02-MAY-18
Manganese (Mn)-Total			102.0		%		80-120	02-MAY-18
Molybdenum (Mo)-Total			103.3		%		80-120	02-MAY-18
Nickel (Ni)-Total			101.2		%		80-120	02-MAY-18
Potassium (K)-Total			111.7		%		80-120	02-MAY-18
Selenium (Se)-Total			102.6		%		80-120	02-MAY-18
Silicon (Si)-Total			101.0		%		80-120	02-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4031003								
WG2761842-2 LCS								
Silver (Ag)-Total			96.0		%		80-120	02-MAY-18
Sodium (Na)-Total			104.7		%		80-120	02-MAY-18
Strontium (Sr)-Total			98.3		%		80-120	02-MAY-18
Thallium (Tl)-Total			95.3		%		80-120	02-MAY-18
Tin (Sn)-Total			97.8		%		80-120	02-MAY-18
Titanium (Ti)-Total			99.0		%		80-120	02-MAY-18
Uranium (U)-Total			90.7		%		80-120	02-MAY-18
Vanadium (V)-Total			105.8		%		80-120	02-MAY-18
Zinc (Zn)-Total			99.4		%		80-120	02-MAY-18
WG2761842-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	02-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	02-MAY-18
Boron (B)-Total			<0.010		mg/L		0.01	02-MAY-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	02-MAY-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	02-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	02-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	02-MAY-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	02-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	02-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	02-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	02-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	02-MAY-18
Potassium (K)-Total			<0.050		mg/L		0.05	02-MAY-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	02-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	02-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	02-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	02-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	02-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4031003								
WG2761842-1 MB								
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	02-MAY-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	02-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	02-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	02-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	02-MAY-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	02-MAY-18
NH3-F-VA	**Water**							
Batch R4033587								
WG2763945-6 LCS								
Ammonia, Total (as N)			101.5		%		85-115	05-MAY-18
WG2763945-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	05-MAY-18
NO2-L-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Nitrite (as N)			97.8		%		90-110	26-APR-18
WG2759163-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-APR-18
NO3-L-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Nitrate (as N)			98.4		%		90-110	26-APR-18
WG2759163-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-APR-18
ORP-VA	**Water**							
Batch R4023943								
WG2759678-1 CRM		**VA-ORP**						
ORP			221		mV		210-230	26-APR-18
P-T-PRES-COL-VA	**Water**							
Batch R4024243								
WG2759216-6 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			105.1		%		80-120	27-APR-18
WG2759216-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	27-APR-18
PH-PCT-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-PCT-VA	**Water**							
Batch R4024400								
WG2759210-2 CRM		**VA-PH7-BUF**						
pH			7.06		pH		6.9-7.1	27-APR-18
PO4-DO-COL-VA	**Water**							
Batch R4023165								
WG2758834-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			100.7		%		80-120	26-APR-18
WG2758834-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	26-APR-18
SO4-IC-N-VA	**Water**							
Batch R4023580								
WG2759163-2 LCS								
Sulfate (SO4)			99.5		%		90-110	26-APR-18
WG2759163-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	26-APR-18
TDS-LOW-VA	**Water**							
Batch R4027808								
WG2760579-3 DUP		**L2084710-1**						
Total Dissolved Solids		960	940		mg/L	2.1	20	28-APR-18
WG2760579-2 LCS								
Total Dissolved Solids			101.5		%		85-115	28-APR-18
WG2760579-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	28-APR-18
TKN-F-VA	**Water**							
Batch R4026236								
WG2760428-6 LCS								
Total Kjeldahl Nitrogen			103.6		%		75-125	29-APR-18
WG2760428-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	29-APR-18
TSS-LOW-VA	**Water**							
Batch R4028949								
WG2761821-2 LCS								
Total Suspended Solids			103.2		%		85-115	30-APR-18
WG2761821-1 MB								
Total Suspended Solids			<1.0		mg/L		1	30-APR-18
TURBIDITY-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-VA	**Water**							
Batch R4023843								
WG2759398-2 CRM		**VA-FORM-40**						
Turbidity			99.8		%		85-115	26-APR-18
WG2759398-5 CRM		**VA-FORM-40**						
Turbidity			101.3		%		85-115	26-APR-18
WG2759398-1 MB								
Turbidity			<0.10		NTU		0.1	26-APR-18
WG2759398-4 MB								
Turbidity			<0.10		NTU		0.1	26-APR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	23-APR-18 13:35	26-APR-18 21:30	0.25	80	hours	EHTR-FM
pH by Meter (Automated)							
	1	23-APR-18 13:35	27-APR-18 11:00	0.25	93	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2084710 were received on 25-APR-18 11:50.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	07-01_2018-04-23	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Lee Wilm			Lab Contact	Can Dang			Email 1:	lee.wilm@teck.com	X	X	X
Email	lee.wilm@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	PO Box 1777, 124B Aspen Drive			Address	8081 Lougheed Hwy			Email 3:	andrew.wight@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-865-5289			Phone Number	604-253-4188			PO number				

SAMPLE DETAILS / **ANALYSIS REQUESTED**

L2084710-COFC

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
Bottle								F	N	F	N	F	N	N					
Preserve								H2SO4	H2SO4	HCL	HCL	HNO3	HNO3						
RG_DW-07-01_WP_Q2-2018_NP	RG_DW-07-01	WP	N	23-Apr-18	1335	G	7	1	1	1	1	1	1	1					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			JC SLC ZC	APR 25 2018 1150 AM

SERVICE REQUEST (rush – subject to availability)					
Regular (default)	X	Sampler's Name	A.Wight	Mobile #	250-433-1159
Priority (2-3 business days) - 50% surcharge		Sampler's Signature	A. Wight	Date/Time	April 23, 2018 1520
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 27-SEP-18
Report Date: 04-OCT-18 15:33 (MT)
Version: FINAL

Client Phone: 250-425-8209

Certificate of Analysis

Lab Work Order #: L2171830

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 01-03_2018-09-25
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2171830-1				
	Description	WP				
	Sampled Date	25-SEP-18				
	Sampled Time	11:00				
	Client ID	RG_DW-01-03_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	370				
	Hardness (as CaCO3) (mg/L)	185				
	pH (pH)	8.30				
	ORP (mV)	479				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	222				
	Turbidity (NTU)	0.20				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	160				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	160				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	1.02				
	Fluoride (F) (mg/L)	0.162				
	Nitrate (as N) (mg/L)	0.782				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.152				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	38.5				
	Anion Sum (meq/L)	4.09				
	Cation Sum (meq/L)	3.77				
	Cation - Anion Balance (%)	-4.1				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50				
	Total Organic Carbon (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00012				
	Barium (Ba)-Total (mg/L)	0.0737				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (ug/L)	0.0140				
	Calcium (Ca)-Total (mg/L)	51.1				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2171830-1				
	Description	WP				
	Sampled Date	25-SEP-18				
	Sampled Time	11:00				
	Client ID	RG_DW-01-03_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00026				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.0272				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	0.00202				
	Lithium (Li)-Total (mg/L)	0.0023				
	Magnesium (Mg)-Total (mg/L)	13.7				
	Manganese (Mn)-Total (mg/L)	0.00010				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.000979				
	Nickel (Ni)-Total (mg/L)	0.00129				
	Potassium (K)-Total (mg/L)	0.397				
	Selenium (Se)-Total (ug/L)	3.26				
	Silicon (Si)-Total (mg/L)	2.18				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	1.28				
	Strontium (Sr)-Total (mg/L)	0.195				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.000798				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0962				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.0722				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (ug/L)	0.0061				
	Calcium (Ca)-Dissolved (mg/L)	52.0				
	Chromium (Cr)-Dissolved (mg/L)	0.00024				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00105				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2171830-1				
	Description	WP				
	Sampled Date	25-SEP-18				
	Sampled Time	11:00				
	Client ID	RG_DW-01-03_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0023				
	Magnesium (Mg)-Dissolved (mg/L)	13.4				
	Manganese (Mn)-Dissolved (mg/L)	<0.00010				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000921				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	0.415				
	Selenium (Se)-Dissolved (ug/L)	3.46				
	Silicon (Si)-Dissolved (mg/L)	2.04				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	1.34				
	Strontium (Sr)-Dissolved (mg/L)	0.201				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.000791				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0060				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2171830-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2171830-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2171830-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2171830-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2171830-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2171830-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2171830-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2171830-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2171830-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2171830-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2171830-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Reference Information

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Reference Information

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

01-03_2018-09-25

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4258470								
WG2892161-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			102.6		%		85-115	04-OCT-18
WG2892161-1 MB								
Acidity (as CaCO3)			1.6		mg/L		2	04-OCT-18
ALK-TITR-VA	**Water**							
Batch R4258179								
WG2892329-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			101.6		%		85-115	03-OCT-18
WG2892329-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	03-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4251450								
WG2889164-2 LCS								
Beryllium (Be)-Dissolved			96.6		%		80-120	28-SEP-18
WG2889164-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	28-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4252068								
WG2890522-2 LCS								
Beryllium (Be)-Total			99.9		%		80-120	30-SEP-18
WG2890522-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	30-SEP-18
BR-L-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Bromide (Br)			101.6		%		85-115	27-SEP-18
WG2889202-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	27-SEP-18
CARBONS-DOC-VA	**Water**							
Batch R4258868								
WG2892446-12 LCS								
Dissolved Organic Carbon			96.7		%		80-120	02-OCT-18
WG2892446-16 LCS								
Dissolved Organic Carbon			97.0		%		80-120	02-OCT-18
WG2892446-4 LCS								
Dissolved Organic Carbon			97.8		%		80-120	02-OCT-18
WG2892446-8 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4258868								
WG2892446-8 LCS								
Dissolved Organic Carbon			98.6		%		80-120	02-OCT-18
WG2892446-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892446-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892446-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892446-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
CARBONS-TOC-VA	**Water**							
Batch R4258865								
WG2892445-1 LCS								
Total Organic Carbon			93.9		%		80-120	02-OCT-18
WG2892445-13 LCS								
Total Organic Carbon			93.1		%		80-120	02-OCT-18
WG2892445-17 LCS								
Total Organic Carbon			93.0		%		80-120	02-OCT-18
WG2892445-21 LCS								
Total Organic Carbon			94.0		%		80-120	02-OCT-18
WG2892445-5 LCS								
Total Organic Carbon			92.0		%		80-120	02-OCT-18
WG2892445-9 LCS								
Total Organic Carbon			93.2		%		80-120	02-OCT-18
WG2892445-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892445-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892445-20 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892445-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892445-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
CL-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-L-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Chloride (Cl)			100.1		%		90-110	27-SEP-18
WG2889202-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	27-SEP-18
EC-PCT-VA	**Water**							
Batch R4258179								
WG2892329-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			102.9		%		90-110	03-OCT-18
WG2892329-1 MB								
Conductivity			<2.0		uS/cm		2	03-OCT-18
F-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Fluoride (F)			100.5		%		90-110	27-SEP-18
WG2889202-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	27-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4249672								
WG2889518-10 LCS								
Mercury (Hg)-Dissolved			98.2		%		80-120	28-SEP-18
WG2889518-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005		mg/L		0.000005	28-SEP-18
HG-T-CVAA-VA	**Water**							
Batch R4258670								
WG2894274-2 LCS								
Mercury (Hg)-Total			96.4		%		80-120	03-OCT-18
WG2894274-1 MB								
Mercury (Hg)-Total			<0.000005		mg/L		0.000005	03-OCT-18
MET-D-CCMS-VA	**Water**							
Batch R4251450								
WG2889164-2 LCS								
Aluminum (Al)-Dissolved			103.5		%		80-120	28-SEP-18
Antimony (Sb)-Dissolved			97.1		%		80-120	28-SEP-18
Arsenic (As)-Dissolved			99.4		%		80-120	28-SEP-18
Barium (Ba)-Dissolved			98.0		%		80-120	28-SEP-18
Bismuth (Bi)-Dissolved			96.8		%		80-120	28-SEP-18
Boron (B)-Dissolved			95.3		%		80-120	28-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4251450								
WG2889164-2 LCS								
Cadmium (Cd)-Dissolved			97.1		%		80-120	28-SEP-18
Calcium (Ca)-Dissolved			96.1		%		80-120	28-SEP-18
Chromium (Cr)-Dissolved			98.5		%		80-120	28-SEP-18
Cobalt (Co)-Dissolved			97.2		%		80-120	28-SEP-18
Copper (Cu)-Dissolved			95.8		%		80-120	28-SEP-18
Iron (Fe)-Dissolved			98.3		%		80-120	28-SEP-18
Lead (Pb)-Dissolved			96.2		%		80-120	28-SEP-18
Lithium (Li)-Dissolved			97.8		%		80-120	28-SEP-18
Magnesium (Mg)-Dissolved			101.6		%		80-120	28-SEP-18
Manganese (Mn)-Dissolved			99.3		%		80-120	28-SEP-18
Molybdenum (Mo)-Dissolved			97.6		%		80-120	28-SEP-18
Nickel (Ni)-Dissolved			99.9		%		80-120	28-SEP-18
Potassium (K)-Dissolved			101.7		%		80-120	28-SEP-18
Selenium (Se)-Dissolved			92.7		%		80-120	28-SEP-18
Silicon (Si)-Dissolved			96.5		%		60-140	28-SEP-18
Silver (Ag)-Dissolved			94.9		%		80-120	28-SEP-18
Sodium (Na)-Dissolved			105.7		%		80-120	28-SEP-18
Strontium (Sr)-Dissolved			100.3		%		80-120	28-SEP-18
Thallium (Tl)-Dissolved			96.4		%		80-120	28-SEP-18
Tin (Sn)-Dissolved			95.3		%		80-120	28-SEP-18
Titanium (Ti)-Dissolved			96.3		%		80-120	28-SEP-18
Uranium (U)-Dissolved			97.6		%		80-120	28-SEP-18
Vanadium (V)-Dissolved			100.1		%		80-120	28-SEP-18
Zinc (Zn)-Dissolved			96.8		%		80-120	28-SEP-18
WG2889164-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	28-SEP-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	28-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4251450								
WG2889164-1 MB		**NP**						
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	28-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	28-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	28-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	28-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	28-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	28-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	28-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4252068								
WG2890522-2 LCS								
Aluminum (Al)-Total			98.0		%		80-120	30-SEP-18
Antimony (Sb)-Total			97.9		%		80-120	30-SEP-18
Arsenic (As)-Total			98.8		%		80-120	30-SEP-18
Barium (Ba)-Total			99.1		%		80-120	30-SEP-18
Bismuth (Bi)-Total			97.8		%		80-120	30-SEP-18
Boron (B)-Total			99.7		%		80-120	30-SEP-18
Cadmium (Cd)-Total			95.1		%		80-120	30-SEP-18
Calcium (Ca)-Total			96.6		%		80-120	30-SEP-18
Chromium (Cr)-Total			98.3		%		80-120	30-SEP-18
Cobalt (Co)-Total			96.2		%		80-120	30-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4252068								
WG2890522-2 LCS								
Copper (Cu)-Total			94.2		%		80-120	30-SEP-18
Iron (Fe)-Total			98.2		%		80-120	30-SEP-18
Lead (Pb)-Total			95.4		%		80-120	30-SEP-18
Lithium (Li)-Total			95.4		%		80-120	30-SEP-18
Magnesium (Mg)-Total			104.8		%		80-120	30-SEP-18
Manganese (Mn)-Total			97.1		%		80-120	30-SEP-18
Molybdenum (Mo)-Total			97.0		%		80-120	30-SEP-18
Nickel (Ni)-Total			96.0		%		80-120	30-SEP-18
Potassium (K)-Total			95.6		%		80-120	30-SEP-18
Selenium (Se)-Total			95.2		%		80-120	30-SEP-18
Silicon (Si)-Total			100.2		%		80-120	30-SEP-18
Silver (Ag)-Total			95.0		%		80-120	30-SEP-18
Sodium (Na)-Total			96.1		%		80-120	30-SEP-18
Strontium (Sr)-Total			95.3		%		80-120	30-SEP-18
Thallium (Tl)-Total			98.7		%		80-120	30-SEP-18
Tin (Sn)-Total			95.3		%		80-120	30-SEP-18
Titanium (Ti)-Total			95.8		%		80-120	30-SEP-18
Uranium (U)-Total			95.5		%		80-120	30-SEP-18
Vanadium (V)-Total			99.7		%		80-120	30-SEP-18
Zinc (Zn)-Total			96.7		%		80-120	30-SEP-18
WG2890522-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	30-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	30-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	30-SEP-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	30-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	30-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	30-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	30-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	30-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4252068								
WG2890522-1 MB								
Lithium (Li)-Total			<0.0010		mg/L		0.001	30-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	30-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	30-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	30-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	30-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	30-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	30-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	30-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	30-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	30-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	30-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	30-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	30-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	30-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	30-SEP-18
NH3-F-VA	**Water**							
Batch R4258020								
WG2892267-6 LCS								
Ammonia, Total (as N)			97.1		%		85-115	03-OCT-18
WG2892267-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	03-OCT-18
NO2-L-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Nitrite (as N)			100.2		%		90-110	27-SEP-18
WG2889202-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	27-SEP-18
NO3-L-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Nitrate (as N)			100.6		%		90-110	27-SEP-18
WG2889202-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	27-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ORP-VA	**Water**							
Batch R4259557								
WG2894934-1 CRM		**VA-ORP**						
ORP			218		mV		210-230	04-OCT-18
P-T-PRES-COL-VA	**Water**							
Batch R4249367								
WG2889228-18 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			104.8		%		80-120	28-SEP-18
WG2889228-17 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	28-SEP-18
PH-PCT-VA	**Water**							
Batch R4258179								
WG2892329-2 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	03-OCT-18
PO4-DO-COL-VA	**Water**							
Batch R4249530								
WG2889343-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			98.6		%		80-120	28-SEP-18
WG2889343-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	28-SEP-18
SO4-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Sulfate (SO4)			101.0		%		90-110	27-SEP-18
WG2889202-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	27-SEP-18
TDS-LOW-VA	**Water**							
Batch R4258531								
WG2892447-2 LCS								
Total Dissolved Solids			102.2		%		85-115	02-OCT-18
WG2892447-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	02-OCT-18
TKN-F-VA	**Water**							
Batch R4254010								
WG2889250-6 LCS								
Total Kjeldahl Nitrogen			104.1		%		75-125	01-OCT-18
WG2889250-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-F-VA	**Water**							
Batch R4254010								
WG2889250-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	01-OCT-18
TSS-LOW-VA	**Water**							
Batch R4257673								
WG2892307-6 LCS								
Total Suspended Solids			95.6		%		85-115	01-OCT-18
WG2892307-5 MB								
Total Suspended Solids			<1.0		mg/L		1	01-OCT-18
TURBIDITY-VA	**Water**							
Batch R4249490								
WG2889323-2 CRM		**VA-FORM-40**						
Turbidity			102.5		%		85-115	28-SEP-18
WG2889323-1 MB								
Turbidity			<0.10		NTU		0.1	28-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	25-SEP-18 11:00	04-OCT-18 08:00	0.25	213	hours	EHTR-FM
pH by Meter (Automated)							
	1	25-SEP-18 11:00	03-OCT-18 08:04	0.25	189	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2171830 were received on 27-SEP-18 10:25.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 01-03_2018-09-25 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program
Project Manager	Cait Good
Email	cait.good@teck.com
Address	421 Pine Avenue
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-425-8202

LABORATORY

Lab Name	ALS Burnaby
Lab Contact	Can Dang
Email	can.dang@alsglobal.com
Address	8081 Lougheed Hwy
City	Burnaby
Province	BC
Postal Code	V5A 1W9
Country	Canada
Phone Number	604-253-4188

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	cait.good@teck.com	X	X	X
Email 2:	carla.fraser@teck.com	X	X	X
Email 3:	colleen.mooney@teck.com	X	X	X
Email 4:	teckcoal@equisonline.com			X
Email 5:				

PO number: VPO00554397

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Fil.	F	N	F	N	F	N	N					
								PRESERV.	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3					
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-01-03_WP_Q3-2018_NP	RG_DW-01-03	WP	no	25-Sep-18	1100	G	#NAME?		1	1	1	1	1	1	1					

L2171830-COFC

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
		180918 1630	RK	27 Sep 18, 10:25am
				2°C

SERVICE REQUEST (rush - subject to availability)

- Regular (default) X
- Priority (2-3 business days) - 50% surcharge
- Emergency (1 Business Day) - 100% surcharge
- For Emergency <1 Day, ASAP or Weekend - Contact ALS

Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Sampler's Signature		Date/Time	September 25, 2018

custody seal intact

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 28-SEP-18
Report Date: 05-OCT-18 17:45 (MT)
Version: FINAL

Client Phone: 250-425-8209

Certificate of Analysis

Lab Work Order #: L2172862

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 02-20_2018-09-26
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2172862-1				
	Description	WP				
	Sampled Date	26-SEP-18				
	Sampled Time	15:30				
	Client ID	RG_DW-220_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	439				
	Hardness (as CaCO3) (mg/L)	226				
	pH (pH)	8.03				
	ORP (mV)	311				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	274				
	Turbidity (NTU)	0.77				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	175				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	175				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	1.67				
	Fluoride (F) (mg/L)	0.211				
	Nitrate (as N) (mg/L)	2.08				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.193 TKNI				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0011				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	58.9				
	Anion Sum (meq/L)	4.92				
	Cation Sum (meq/L)	4.63				
	Cation - Anion Balance (%)	-3.1				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50				
	Total Organic Carbon (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	<0.00010				
	Barium (Ba)-Total (mg/L)	0.0879				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (ug/L)	0.0086				
	Calcium (Ca)-Total (mg/L)	62.1				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2172862-1				
	Description	WP				
	Sampled Date	26-SEP-18				
	Sampled Time	15:30				
	Client ID	RG_DW-220_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00029				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.00587				
	Iron (Fe)-Total (mg/L)	0.014				
	Lead (Pb)-Total (mg/L)	0.000158				
	Lithium (Li)-Total (mg/L)	0.0068				
	Magnesium (Mg)-Total (mg/L)	19.4				
	Manganese (Mn)-Total (mg/L)	0.00039				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00116				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Potassium (K)-Total (mg/L)	0.649				
	Selenium (Se)-Total (ug/L)	9.60				
	Silicon (Si)-Total (mg/L)	2.45				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	2.59				
	Strontium (Sr)-Total (mg/L)	0.220				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.000990				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0068				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.0877				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (ug/L)	0.0075				
	Calcium (Ca)-Dissolved (mg/L)	60.5				
	Chromium (Cr)-Dissolved (mg/L)	0.00027				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00500				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2172862-1				
	Description	WP				
	Sampled Date	26-SEP-18				
	Sampled Time	15:30				
	Client ID	RG_DW-220_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	0.000113				
	Lithium (Li)-Dissolved (mg/L)	0.0063				
	Magnesium (Mg)-Dissolved (mg/L)	18.1				
	Manganese (Mn)-Dissolved (mg/L)	0.00037				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00115				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	0.623				
	Selenium (Se)-Dissolved (ug/L)	9.87				
	Silicon (Si)-Dissolved (mg/L)	2.27				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	2.36				
	Strontium (Sr)-Dissolved (mg/L)	0.229				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00105				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0062				

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Total Organic Carbon	MS-B	L2172862-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2172862-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2172862-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2172862-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2172862-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2172862-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2172862-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2172862-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2172862-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2172862-1
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2172862-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2172862-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2172862-1
Matrix Spike	Uranium (U)-Total	MS-B	L2172862-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA	Water	Oxidation reduction potential by Elect.	ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

Reference Information

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

02-20_2018-09-26

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4254968								
WG2890806-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			102.4		%		85-115	02-OCT-18
WG2890806-1 MB								
Acidity (as CaCO3)			1.9		mg/L		2	02-OCT-18
ALK-TITR-VA	**Water**							
Batch R4252690								
WG2890807-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			102.8		%		85-115	01-OCT-18
WG2890807-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	01-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4256497								
WG2890895-2 LCS								
Beryllium (Be)-Dissolved			97.5		%		80-120	30-SEP-18
WG2890895-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	30-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4257726								
WG2891754-2 LCS								
Beryllium (Be)-Total			106.3		%		80-120	01-OCT-18
WG2891754-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	01-OCT-18
BR-L-IC-N-VA	**Water**							
Batch R4254656								
WG2890725-2 LCS								
Bromide (Br)			102.4		%		85-115	30-SEP-18
WG2890725-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	30-SEP-18
CARBONS-DOC-VA	**Water**							
Batch R4260003								
WG2893623-4 LCS								
Dissolved Organic Carbon			99.8		%		80-120	03-OCT-18
WG2893623-8 LCS								
Dissolved Organic Carbon			98.1		%		80-120	03-OCT-18
WG2893623-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	03-OCT-18
WG2893623-7 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4260003								
WG2893623-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	03-OCT-18
WG2893623-6 MS		**L2172862-1**						
Dissolved Organic Carbon			91.9		%		70-130	03-OCT-18
CARBONS-TOC-VA	**Water**							
Batch R4260002								
WG2893622-1 LCS								
Total Organic Carbon			94.6		%		80-120	03-OCT-18
WG2893622-13 LCS								
Total Organic Carbon			102.1		%		80-120	03-OCT-18
WG2893622-5 LCS								
Total Organic Carbon			95.7		%		80-120	03-OCT-18
WG2893622-9 LCS								
Total Organic Carbon			95.3		%		80-120	03-OCT-18
WG2893622-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	03-OCT-18
WG2893622-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	03-OCT-18
WG2893622-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	03-OCT-18
WG2893622-7 MS		**L2172862-1**						
Total Organic Carbon			99.2		%		70-130	03-OCT-18
CL-L-IC-N-VA	**Water**							
Batch R4254656								
WG2890725-2 LCS								
Chloride (Cl)			101.1		%		90-110	30-SEP-18
WG2890725-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	30-SEP-18
EC-PCT-VA	**Water**							
Batch R4254968								
WG2890806-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			100.6		%		90-110	02-OCT-18
WG2890806-1 MB								
Conductivity			<2.0		uS/cm		2	02-OCT-18
F-IC-N-VA	**Water**							

Quality Control Report

Workorder: L2172862 Report Date: 05-OCT-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-VA	**Water**							
Batch R4254656								
WG2890725-2 LCS								
Fluoride (F)			100.1		%		90-110	30-SEP-18
WG2890725-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	30-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4258670								
WG2890491-22 LCS								
Mercury (Hg)-Dissolved			106.3		%		80-120	03-OCT-18
Batch R4259155								
WG2890491-21 MB								
Mercury (Hg)-Dissolved			<0.000005		mg/L		0.000005	04-OCT-18
HG-T-CVAA-VA	**Water**							
Batch R4259155								
WG2894923-2 LCS								
Mercury (Hg)-Total			98.6		%		80-120	04-OCT-18
WG2894923-1 MB								
Mercury (Hg)-Total			<0.000005		mg/L		0.000005	04-OCT-18
MET-D-CCMS-VA	**Water**							
Batch R4256497								
WG2890895-2 LCS								
Aluminum (Al)-Dissolved			103.4		%		80-120	30-SEP-18
Antimony (Sb)-Dissolved			98.7		%		80-120	30-SEP-18
Arsenic (As)-Dissolved			99.4		%		80-120	30-SEP-18
Barium (Ba)-Dissolved			98.8		%		80-120	30-SEP-18
Bismuth (Bi)-Dissolved			99.6		%		80-120	30-SEP-18
Boron (B)-Dissolved			99.8		%		80-120	30-SEP-18
Cadmium (Cd)-Dissolved			98.3		%		80-120	30-SEP-18
Calcium (Ca)-Dissolved			97.3		%		80-120	30-SEP-18
Chromium (Cr)-Dissolved			100.6		%		80-120	30-SEP-18
Cobalt (Co)-Dissolved			97.7		%		80-120	30-SEP-18
Copper (Cu)-Dissolved			96.6		%		80-120	30-SEP-18
Iron (Fe)-Dissolved			95.3		%		80-120	30-SEP-18
Lead (Pb)-Dissolved			98.5		%		80-120	30-SEP-18
Lithium (Li)-Dissolved			99.7		%		80-120	30-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4256497								
WG2890895-2 LCS								
Magnesium (Mg)-Dissolved			102.6		%		80-120	30-SEP-18
Manganese (Mn)-Dissolved			98.0		%		80-120	30-SEP-18
Molybdenum (Mo)-Dissolved			102.1		%		80-120	30-SEP-18
Nickel (Ni)-Dissolved			99.4		%		80-120	30-SEP-18
Potassium (K)-Dissolved			106.5		%		80-120	30-SEP-18
Selenium (Se)-Dissolved			100.3		%		80-120	30-SEP-18
Silicon (Si)-Dissolved			98.8		%		60-140	30-SEP-18
Silver (Ag)-Dissolved			94.3		%		80-120	30-SEP-18
Sodium (Na)-Dissolved			99.2		%		80-120	30-SEP-18
Strontium (Sr)-Dissolved			103.9		%		80-120	30-SEP-18
Thallium (Tl)-Dissolved			99.2		%		80-120	30-SEP-18
Tin (Sn)-Dissolved			97.3		%		80-120	30-SEP-18
Titanium (Ti)-Dissolved			94.9		%		80-120	30-SEP-18
Uranium (U)-Dissolved			100.8		%		80-120	30-SEP-18
Vanadium (V)-Dissolved			100.0		%		80-120	30-SEP-18
Zinc (Zn)-Dissolved			97.7		%		80-120	30-SEP-18
WG2890895-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	30-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	30-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	30-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	30-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	30-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	30-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	30-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	30-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	30-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	30-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	30-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4256497								
WG2890895-1 MB		**NP**						
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	30-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	30-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	30-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	30-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	30-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	30-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	30-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	30-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	30-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	30-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	30-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	30-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4257726								
WG2891754-2 LCS								
Aluminum (Al)-Total			113.9		%		80-120	01-OCT-18
Antimony (Sb)-Total			108.7		%		80-120	01-OCT-18
Arsenic (As)-Total			110.7		%		80-120	01-OCT-18
Barium (Ba)-Total			110.5		%		80-120	01-OCT-18
Bismuth (Bi)-Total			100.8		%		80-120	01-OCT-18
Boron (B)-Total			104.5		%		80-120	01-OCT-18
Cadmium (Cd)-Total			110.7		%		80-120	01-OCT-18
Calcium (Ca)-Total			103.7		%		80-120	01-OCT-18
Chromium (Cr)-Total			114.4		%		80-120	01-OCT-18
Cobalt (Co)-Total			111.1		%		80-120	01-OCT-18
Copper (Cu)-Total			111.1		%		80-120	01-OCT-18
Iron (Fe)-Total			104.1		%		80-120	01-OCT-18
Lead (Pb)-Total			103.2		%		80-120	01-OCT-18
Lithium (Li)-Total			105.8		%		80-120	01-OCT-18
Magnesium (Mg)-Total			108.4		%		80-120	01-OCT-18
Manganese (Mn)-Total			109.2		%		80-120	01-OCT-18
Molybdenum (Mo)-Total			109.5		%		80-120	01-OCT-18
Nickel (Ni)-Total			111.0		%		80-120	01-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4257726								
WG2891754-2 LCS								
Potassium (K)-Total			114.8		%		80-120	01-OCT-18
Selenium (Se)-Total			101.6		%		80-120	01-OCT-18
Silicon (Si)-Total			108.9		%		80-120	01-OCT-18
Silver (Ag)-Total			102.5		%		80-120	01-OCT-18
Sodium (Na)-Total			112.1		%		80-120	01-OCT-18
Strontium (Sr)-Total			104.7		%		80-120	01-OCT-18
Thallium (Tl)-Total			104.2		%		80-120	01-OCT-18
Tin (Sn)-Total			104.2		%		80-120	01-OCT-18
Titanium (Ti)-Total			102.0		%		80-120	01-OCT-18
Uranium (U)-Total			102.4		%		80-120	01-OCT-18
Vanadium (V)-Total			114.3		%		80-120	01-OCT-18
Zinc (Zn)-Total			115.1		%		80-120	01-OCT-18
WG2891754-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	01-OCT-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	01-OCT-18
Boron (B)-Total			<0.010		mg/L		0.01	01-OCT-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	01-OCT-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	01-OCT-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	01-OCT-18
Iron (Fe)-Total			<0.010		mg/L		0.01	01-OCT-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	01-OCT-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	01-OCT-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	01-OCT-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	01-OCT-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	01-OCT-18
Potassium (K)-Total			<0.050		mg/L		0.05	01-OCT-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	01-OCT-18
Silicon (Si)-Total			<0.10		mg/L		0.1	01-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4257726								
WG2891754-1 MB								
Silver (Ag)-Total			<0.000010		mg/L		0.00001	01-OCT-18
Sodium (Na)-Total			<0.050		mg/L		0.05	01-OCT-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	01-OCT-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	01-OCT-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	01-OCT-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	01-OCT-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	01-OCT-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	01-OCT-18
NH3-F-VA	**Water**							
Batch R4258734								
WG2893373-10 LCS								
Ammonia, Total (as N)			101.3		%		85-115	03-OCT-18
WG2893373-9 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	03-OCT-18
NO2-L-IC-N-VA	**Water**							
Batch R4254656								
WG2890725-2 LCS								
Nitrite (as N)			100.3		%		90-110	30-SEP-18
WG2890725-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	30-SEP-18
NO3-L-IC-N-VA	**Water**							
Batch R4254656								
WG2890725-2 LCS								
Nitrate (as N)			101.2		%		90-110	30-SEP-18
WG2890725-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	30-SEP-18
ORP-VA	**Water**							
Batch R4259557								
WG2894934-1 CRM		**VA-ORP**						
ORP			218		mV		210-230	04-OCT-18
P-T-PRES-COL-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-PRES-COL-VA	**Water**							
Batch R4254276								
WG2890887-6 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			100.9		%		80-120	30-SEP-18
WG2890887-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	30-SEP-18
PH-PCT-VA	**Water**							
Batch R4254968								
WG2890806-2 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	02-OCT-18
PO4-DO-COL-VA	**Water**							
Batch R4251670								
WG2890499-34 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			98.7		%		80-120	29-SEP-18
WG2890499-33 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	29-SEP-18
SO4-IC-N-VA	**Water**							
Batch R4254656								
WG2890725-2 LCS								
Sulfate (SO4)			101.8		%		90-110	30-SEP-18
WG2890725-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	30-SEP-18
TDS-LOW-VA	**Water**							
Batch R4262328								
WG2894707-2 LCS								
Total Dissolved Solids			98.7		%		85-115	04-OCT-18
WG2894707-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	04-OCT-18
TKN-F-VA	**Water**							
Batch R4257967								
WG2892223-6 LCS								
Total Kjeldahl Nitrogen			99.4		%		75-125	02-OCT-18
WG2892223-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	02-OCT-18
TSS-LOW-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-LOW-VA	**Water**							
Batch R4259349								
WG2894763-2 LCS								
Total Suspended Solids			88.4		%		85-115	04-OCT-18
WG2894763-1 MB								
Total Suspended Solids			<1.0		mg/L		1	04-OCT-18
TURBIDITY-VA	**Water**							
Batch R4252687								
WG2891366-2 CRM		**VA-FORM-40**						
Turbidity			100.5		%		85-115	01-OCT-18
WG2891366-1 MB								
Turbidity			<0.10		NTU		0.1	01-OCT-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Low Level TDS (3.0mg/L) by Gravimetric							
	1	26-SEP-18 15:30	04-OCT-18 20:50	7	8	days	EHT
Oxidation reduction potential by Elect.							
	1	26-SEP-18 15:30	04-OCT-18 08:00	0.25	185	hours	EHTR-FM
Turbidity by Meter							
	1	26-SEP-18 15:30	01-OCT-18 07:22	3	5	days	EHT
pH by Meter (Automated)							
	1	26-SEP-18 15:30	01-OCT-18 08:23	0.25	113	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	26-SEP-18 15:30	30-SEP-18 08:35	3	4	days	EHT
Nitrite in Water by IC (Low Level)							
	1	26-SEP-18 15:30	30-SEP-18 08:35	3	4	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2172862 were received on 28-SEP-18 09:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

Page 1 of 1

COC ID: 02-20 [redacted] 2018-09-26 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Can Dang			Email 1:	cait.good@teck.com	X	X	X
Email	cait.good@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	8081 Lougheed Hwy			Email 3:	colleen.mooney@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-425-8202			Phone Number	604-253-4188			PO number	VPO00554397			

SAMPLE DETAILS — ANALYSIS REQUESTED — Filtered : F: Field, L: Lab, FL: Field & Lab, N: None

L2172862-COFC

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	F	N	F	N	F	N	N					
								PRESERV	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3						
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-[redacted]WP_Q3-2018_NP	RG_DW-[redacted]30	WP	no	26-Sep-18	1530	G	#NAME?		1	1	1	1	1	1	1					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	[signature]	180926/1630	JC 2C	9/28/18 9:04

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Sampler's Signature	[signature]	Date/Time	September 26, 2018

Custody seal intact

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 01-OCT-18
Report Date: 09-OCT-18 17:22 (MT)
Version: FINAL

Client Phone: 250-425-8209

Certificate of Analysis

Lab Work Order #: L2173526

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers:
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2173526-1				
	Description	WP				
	Sampled Date	27-SEP-18				
	Sampled Time	09:35				
	Client ID	RG_DW-03-01_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	808				
	Hardness (as CaCO3) (mg/L)	448				
	pH (pH)	7.53				
	ORP (mV)	349				
	Total Suspended Solids (mg/L)	1.0				
	Total Dissolved Solids (mg/L)	508				
	Turbidity (NTU)	1.13				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	17.8				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	328				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	328				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.25 DLDS				
	Chloride (Cl) (mg/L)	37.7				
	Fluoride (F) (mg/L)	0.18				
	Nitrate (as N) (mg/L)	0.090				
	Nitrite (as N) (mg/L)	<0.0050 DLDS				
	Total Kjeldahl Nitrogen (mg/L)	<0.050				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0010				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	61.4				
	Anion Sum (meq/L)	8.90				
	Cation Sum (meq/L)	9.66				
	Cation - Anion Balance (%)	4.1				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.84				
	Total Organic Carbon (mg/L)	0.90				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00012				
	Barium (Ba)-Total (mg/L)	0.127				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.036				
	Cadmium (Cd)-Total (ug/L)	0.0793				
	Calcium (Ca)-Total (mg/L)	114				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2173526-1				
	Description	WP				
	Sampled Date	27-SEP-18				
	Sampled Time	09:35				
	Client ID	RG_DW-03-01_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00031				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	0.096				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	0.0188				
	Magnesium (Mg)-Total (mg/L)	37.4				
	Manganese (Mn)-Total (mg/L)	0.137				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00314				
	Nickel (Ni)-Total (mg/L)	0.00275				
	Potassium (K)-Total (mg/L)	2.05				
	Selenium (Se)-Total (ug/L)	0.171				
	Silicon (Si)-Total (mg/L)	4.89				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	15.1				
	Strontium (Sr)-Total (mg/L)	0.431				
	Thallium (Tl)-Total (mg/L)	0.000102				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00104				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.145				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.034				
	Cadmium (Cd)-Dissolved (ug/L)	0.0727				
	Calcium (Ca)-Dissolved (mg/L)	119				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	<0.00050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2173526-1				
	Description	WP				
	Sampled Date	27-SEP-18				
	Sampled Time	09:35				
	Client ID	RG_DW-03-01_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	0.047				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0198				
	Magnesium (Mg)-Dissolved (mg/L)	36.7				
	Manganese (Mn)-Dissolved (mg/L)	0.145				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00316				
	Nickel (Ni)-Dissolved (mg/L)	0.00252				
	Potassium (K)-Dissolved (mg/L)	2.08				
	Selenium (Se)-Dissolved (ug/L)	0.204				
	Silicon (Si)-Dissolved (mg/L)	4.84				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	15.1				
	Strontium (Sr)-Dissolved (mg/L)	0.447				
	Thallium (Tl)-Dissolved (mg/L)	0.000107				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.000969				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0014				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Dissolved Organic Carbon	B	L2173526-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2173526-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2173526-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2173526-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2173526-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2173526-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2173526-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents.

Reference Information

Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

Reference Information

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4257932								
WG2892437-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			107.5		%		85-115	02-OCT-18
WG2892437-1 MB								
Acidity (as CaCO3)			1.9		mg/L		2	02-OCT-18
ALK-TITR-VA	**Water**							
Batch R4259643								
WG2892365-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			101.9		%		85-115	04-OCT-18
WG2892365-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	04-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4258128								
WG2892241-2 LCS								
Beryllium (Be)-Dissolved			99.0		%		80-120	02-OCT-18
WG2892241-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	02-OCT-18
BE-T-L-CCMS-VA	**Water**							
Batch R4259036								
WG2893525-3 DUP		**L2173526-1**						
Beryllium (Be)-Total		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	03-OCT-18
WG2893525-2 LCS								
Beryllium (Be)-Total			93.8		%		80-120	03-OCT-18
WG2893525-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	03-OCT-18
BR-L-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-7 DUP		**L2173526-1**						
Bromide (Br)		<0.25	<0.25	RPD-NA	mg/L	N/A	20	02-OCT-18
WG2892319-6 LCS								
Bromide (Br)			102.1		%		85-115	02-OCT-18
WG2892319-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	02-OCT-18
CARBONS-DOC-VA	**Water**							
Batch R4263206								
WG2894306-13 DUP		**L2173526-1**						
Dissolved Organic Carbon		0.84	0.95		mg/L	12	20	04-OCT-18
WG2894306-12 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4263206								
WG2894306-12 LCS								
Dissolved Organic Carbon			97.9		%		80-120	04-OCT-18
WG2894306-16 LCS								
Dissolved Organic Carbon			104.4		%		80-120	04-OCT-18
WG2894306-4 LCS								
Dissolved Organic Carbon			97.8		%		80-120	04-OCT-18
WG2894306-8 LCS								
Dissolved Organic Carbon			97.0		%		80-120	04-OCT-18
WG2894306-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
WG2894306-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
WG2894306-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
WG2894306-7 MB								
Dissolved Organic Carbon			0.68	B	mg/L		0.5	04-OCT-18
CARBONS-TOC-VA	**Water**							
Batch R4263204								
WG2894305-10 DUP		**L2173526-1**						
Total Organic Carbon		0.90	0.89		mg/L	1.2	20	04-OCT-18
WG2894305-1 LCS								
Total Organic Carbon			99.0		%		80-120	04-OCT-18
WG2894305-13 LCS								
Total Organic Carbon			102.3		%		80-120	04-OCT-18
WG2894305-5 LCS								
Total Organic Carbon			101.2		%		80-120	04-OCT-18
WG2894305-9 LCS								
Total Organic Carbon			96.7		%		80-120	04-OCT-18
WG2894305-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
WG2894305-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
WG2894305-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
CL-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-L-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-7 DUP		**L2173526-1**						
Chloride (Cl)		37.7	37.3		mg/L	1.1	20	02-OCT-18
WG2892319-6 LCS								
Chloride (Cl)			100.4		%		90-110	02-OCT-18
WG2892319-5 MB								
Chloride (Cl)			<0.10		mg/L		0.1	02-OCT-18
EC-PCT-VA	**Water**							
Batch R4257932								
WG2892437-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			100.9		%		90-110	02-OCT-18
WG2892437-1 MB								
Conductivity			<2.0		uS/cm		2	02-OCT-18
F-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-7 DUP		**L2173526-1**						
Fluoride (F)		0.18	0.18		mg/L	3.5	20	02-OCT-18
WG2892319-6 LCS								
Fluoride (F)			99.8		%		90-110	02-OCT-18
WG2892319-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	02-OCT-18
HG-D-CVAA-VA	**Water**							
Batch R4256030								
WG2892605-6 LCS								
Mercury (Hg)-Dissolved			99.0		%		80-120	02-OCT-18
WG2892605-5 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	02-OCT-18
HG-T-CVAA-VA	**Water**							
Batch R4263798								
WG2897766-2 LCS								
Mercury (Hg)-Total			95.5		%		80-120	07-OCT-18
WG2897766-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	07-OCT-18
MET-D-CCMS-VA	**Water**							
Batch R4258128								
WG2892241-2 LCS								
Aluminum (Al)-Dissolved			102.0		%		80-120	02-OCT-18
Antimony (Sb)-Dissolved			104.7		%		80-120	02-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4258128								
WG2892241-2 LCS								
Arsenic (As)-Dissolved			99.4		%		80-120	02-OCT-18
Barium (Ba)-Dissolved			103.1		%		80-120	02-OCT-18
Bismuth (Bi)-Dissolved			108.1		%		80-120	02-OCT-18
Boron (B)-Dissolved			95.4		%		80-120	02-OCT-18
Cadmium (Cd)-Dissolved			98.5		%		80-120	02-OCT-18
Calcium (Ca)-Dissolved			97.4		%		80-120	02-OCT-18
Chromium (Cr)-Dissolved			102.5		%		80-120	02-OCT-18
Cobalt (Co)-Dissolved			101.5		%		80-120	02-OCT-18
Copper (Cu)-Dissolved			101.3		%		80-120	02-OCT-18
Iron (Fe)-Dissolved			93.1		%		80-120	02-OCT-18
Lead (Pb)-Dissolved			105.5		%		80-120	02-OCT-18
Lithium (Li)-Dissolved			99.8		%		80-120	02-OCT-18
Magnesium (Mg)-Dissolved			102.7		%		80-120	02-OCT-18
Manganese (Mn)-Dissolved			104.8		%		80-120	02-OCT-18
Molybdenum (Mo)-Dissolved			99.0		%		80-120	02-OCT-18
Nickel (Ni)-Dissolved			101.1		%		80-120	02-OCT-18
Potassium (K)-Dissolved			99.4		%		80-120	02-OCT-18
Selenium (Se)-Dissolved			101.6		%		80-120	02-OCT-18
Silicon (Si)-Dissolved			99.8		%		60-140	02-OCT-18
Silver (Ag)-Dissolved			93.5		%		80-120	02-OCT-18
Sodium (Na)-Dissolved			107.5		%		80-120	02-OCT-18
Strontium (Sr)-Dissolved			93.7		%		80-120	02-OCT-18
Thallium (Tl)-Dissolved			110.2		%		80-120	02-OCT-18
Tin (Sn)-Dissolved			99.3		%		80-120	02-OCT-18
Titanium (Ti)-Dissolved			104.4		%		80-120	02-OCT-18
Uranium (U)-Dissolved			94.6		%		80-120	02-OCT-18
Vanadium (V)-Dissolved			106.6		%		80-120	02-OCT-18
Zinc (Zn)-Dissolved			101.7		%		80-120	02-OCT-18
WG2892241-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	02-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4258128								
WG2892241-1 MB		**NP**						
Boron (B)-Dissolved			<0.010		mg/L		0.01	02-OCT-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	02-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	02-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	02-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	02-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	02-OCT-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	02-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	02-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	02-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	02-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	02-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	02-OCT-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	02-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	02-OCT-18
MET-T-CCMS-VA	**Water**							
Batch R4259036								
WG2893525-3 DUP		**L2173526-1**						
Aluminum (Al)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	03-OCT-18
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-OCT-18
Arsenic (As)-Total		0.00012	0.00014		mg/L	15	20	03-OCT-18
Barium (Ba)-Total		0.127	0.125		mg/L	1.0	20	03-OCT-18
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-OCT-18
Boron (B)-Total		0.036	0.037		mg/L	3.1	20	03-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4259036								
WG2893525-3 DUP		**L2173526-1**						
Cadmium (Cd)-Total		0.0000793	0.0000813		mg/L	2.4	20	03-OCT-18
Calcium (Ca)-Total		114	118		mg/L	3.0	20	03-OCT-18
Chromium (Cr)-Total		0.00031	0.00012	J	mg/L	0.00019	0.0002	03-OCT-18
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-OCT-18
Copper (Cu)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-18
Iron (Fe)-Total		0.096	0.101		mg/L	5.7	20	03-OCT-18
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-OCT-18
Lithium (Li)-Total		0.0188	0.0190		mg/L	0.8	20	03-OCT-18
Magnesium (Mg)-Total		37.4	37.3		mg/L	0.0	20	03-OCT-18
Manganese (Mn)-Total		0.137	0.138		mg/L	1.0	20	03-OCT-18
Molybdenum (Mo)-Total		0.00314	0.00319		mg/L	1.6	20	03-OCT-18
Nickel (Ni)-Total		0.00275	0.00271		mg/L	1.4	20	03-OCT-18
Potassium (K)-Total		2.05	2.05		mg/L	0.4	20	03-OCT-18
Selenium (Se)-Total		0.000171	0.000150		mg/L	13	20	03-OCT-18
Silicon (Si)-Total		4.89	4.86		mg/L	0.5	20	03-OCT-18
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	03-OCT-18
Sodium (Na)-Total		15.1	15.4		mg/L	2.1	20	03-OCT-18
Strontium (Sr)-Total		0.431	0.411		mg/L	4.9	20	03-OCT-18
Thallium (Tl)-Total		0.000102	0.000098		mg/L	4.5	20	03-OCT-18
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-OCT-18
Titanium (Ti)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	03-OCT-18
Uranium (U)-Total		0.00104	0.000999		mg/L	4.1	20	03-OCT-18
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-18
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	03-OCT-18
WG2893525-2 LCS								
Aluminum (Al)-Total			101.4		%		80-120	03-OCT-18
Antimony (Sb)-Total			105.4		%		80-120	03-OCT-18
Arsenic (As)-Total			96.5		%		80-120	03-OCT-18
Barium (Ba)-Total			98.8		%		80-120	03-OCT-18
Bismuth (Bi)-Total			98.7		%		80-120	03-OCT-18
Boron (B)-Total			95.9		%		80-120	03-OCT-18
Cadmium (Cd)-Total			100.8		%		80-120	03-OCT-18
Calcium (Ca)-Total			94.5		%		80-120	03-OCT-18
Chromium (Cr)-Total			100.3		%		80-120	03-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4259036								
WG2893525-2 LCS								
Cobalt (Co)-Total			99.2		%		80-120	03-OCT-18
Copper (Cu)-Total			97.7		%		80-120	03-OCT-18
Iron (Fe)-Total			97.2		%		80-120	03-OCT-18
Lead (Pb)-Total			97.9		%		80-120	03-OCT-18
Lithium (Li)-Total			91.8		%		80-120	03-OCT-18
Magnesium (Mg)-Total			102.2		%		80-120	03-OCT-18
Manganese (Mn)-Total			97.3		%		80-120	03-OCT-18
Molybdenum (Mo)-Total			100.3		%		80-120	03-OCT-18
Nickel (Ni)-Total			100.5		%		80-120	03-OCT-18
Potassium (K)-Total			101.1		%		80-120	03-OCT-18
Selenium (Se)-Total			95.1		%		80-120	03-OCT-18
Silicon (Si)-Total			101.9		%		80-120	03-OCT-18
Silver (Ag)-Total			95.3		%		80-120	03-OCT-18
Sodium (Na)-Total			106.0		%		80-120	03-OCT-18
Strontium (Sr)-Total			96.5		%		80-120	03-OCT-18
Thallium (Tl)-Total			95.1		%		80-120	03-OCT-18
Tin (Sn)-Total			101.2		%		80-120	03-OCT-18
Titanium (Ti)-Total			88.8		%		80-120	03-OCT-18
Uranium (U)-Total			99.5		%		80-120	03-OCT-18
Vanadium (V)-Total			102.2		%		80-120	03-OCT-18
Zinc (Zn)-Total			100.9		%		80-120	03-OCT-18
WG2893525-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	03-OCT-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	03-OCT-18
Boron (B)-Total			<0.010		mg/L		0.01	03-OCT-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	03-OCT-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	03-OCT-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	03-OCT-18
Iron (Fe)-Total			<0.010		mg/L		0.01	03-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4259036								
WG2893525-1 MB								
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-OCT-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	03-OCT-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	03-OCT-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	03-OCT-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	03-OCT-18
Potassium (K)-Total			<0.050		mg/L		0.05	03-OCT-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	03-OCT-18
Silicon (Si)-Total			<0.10		mg/L		0.1	03-OCT-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	03-OCT-18
Sodium (Na)-Total			<0.050		mg/L		0.05	03-OCT-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	03-OCT-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	03-OCT-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	03-OCT-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	03-OCT-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	03-OCT-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	03-OCT-18
NH3-F-VA	**Water**							
Batch R4259545								
WG2894730-6 LCS								
Ammonia, Total (as N)			101.2		%		85-115	04-OCT-18
WG2894730-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	04-OCT-18
NO2-L-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-7 DUP		**L2173526-1**						
Nitrite (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-OCT-18
WG2892319-6 LCS								
Nitrite (as N)			100.5		%		90-110	02-OCT-18
WG2892319-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	02-OCT-18
NO3-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-7 DUP		**L2173526-1**						
Nitrate (as N)		0.090	0.089		mg/L	2.0	20	02-OCT-18
WG2892319-6 LCS								
Nitrate (as N)			100.7		%		90-110	02-OCT-18
WG2892319-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	02-OCT-18
ORP-VA	**Water**							
Batch R4263777								
WG2897722-1 CRM		**VA-ORP**						
ORP			218		mV		210-230	07-OCT-18
P-T-PRES-COL-VA	**Water**							
Batch R4257952								
WG2892451-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			99.5		%		80-120	02-OCT-18
WG2892451-3 DUP		**L2173526-1**						
Phosphorus (P)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	02-OCT-18
WG2892451-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	02-OCT-18
PH-PCT-VA	**Water**							
Batch R4257932								
WG2892437-2 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	02-OCT-18
PO4-DO-COL-VA	**Water**							
Batch R4255810								
WG2892361-6 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.1		%		80-120	02-OCT-18
WG2892361-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-OCT-18
SO4-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-7 DUP		**L2173526-1**						
Sulfate (SO4)		61.4	60.7		mg/L	1.1	20	02-OCT-18
WG2892319-6 LCS								
Sulfate (SO4)			101.1		%		90-110	02-OCT-18
WG2892319-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	02-OCT-18
TDS-LOW-VA	**Water**							
Batch R4262853								
WG2894889-5 LCS								
Total Dissolved Solids			97.8		%		85-115	04-OCT-18
WG2894889-4 MB								
Total Dissolved Solids			<3.0		mg/L		3	04-OCT-18
TKN-F-VA	**Water**							
Batch R4258829								
WG2892925-11 DUP		**L2173526-1**						
Total Kjeldahl Nitrogen		<0.050	<0.050	RPD-NA	mg/L	N/A	20	03-OCT-18
WG2892925-10 LCS								
Total Kjeldahl Nitrogen			98.4		%		75-125	03-OCT-18
WG2892925-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	03-OCT-18
TSS-LOW-VA	**Water**							
Batch R4259349								
WG2894763-2 LCS								
Total Suspended Solids			88.4		%		85-115	04-OCT-18
WG2894763-1 MB								
Total Suspended Solids			<1.0		mg/L		1	04-OCT-18
TURBIDITY-VA	**Water**							
Batch R4258365								
WG2893761-2 CRM		**VA-FORM-40**						
Turbidity			99.5		%		85-115	03-OCT-00
WG2893761-1 MB								
Turbidity			<0.10		NTU		0.1	03-OCT-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	27-SEP-18 09:35	07-OCT-18 13:00	0.25	243	hours	EHTR-FM
Turbidity by Meter							
	1	27-SEP-18 09:35	03-OCT-18 09:00	3	6	days	EHTR
pH by Meter (Automated)							
	1	27-SEP-18 09:35	02-OCT-18 20:15	0.25	131	hours	EHTR-FM
Anions and Nutrients							
Diss. Orthophosphate in Water by Colour							
	1	27-SEP-18 09:35	02-OCT-18 04:33	3	5	days	EHTR
Nitrate in Water by IC (Low Level)							
	1	27-SEP-18 09:35	02-OCT-18 07:08	3	5	days	EHTR
Nitrite in Water by IC (Low Level)							
	1	27-SEP-18 09:35	02-OCT-18 07:08	3	5	days	EHTR

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2173526 were received on 01-OCT-18 08:50.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	03-01_2018-09-27	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Can Dang			Email 1:	cait.good@teck.com	X	X	X
Email	cait.good@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	8081 Lougheed Hwy			Email 3:	colleen.mooney@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-425-8202			Phone Number	604-253-4188			PO number	VPO00554397			

L2173526-COFC

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL.	F	N	F	N	F	N	N					
								PRESERV.	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3					
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-03-01_WP_Q3-2018_NP	RG_DW-03-01	WP	no	27-Sep-18	0935	G	~~#NAME?~~ F		1	1	1	1	1	1	1					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Ryan Schopman	180927/1200	6.1 Hyat	10/1/18 8:50

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Sampler's Signature		Date/Time	September 26, 2018

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 01-OCT-18
Report Date: 09-OCT-18 17:30 (MT)
Version: FINAL

Client Phone: 250-425-8209

Certificate of Analysis

Lab Work Order #: L2173527

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers:
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2173527-1				
	Description	WP				
	Sampled Date	27-SEP-18				
	Sampled Time	08:15				
	Client ID	RG_DW-03-04_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	572				
	Hardness (as CaCO3) (mg/L)	318				
	pH (pH)	7.90				
	ORP (mV)	358				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	403				
	Turbidity (NTU)	<0.10				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	5.2				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	180				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	180				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	0.078				
	Chloride (Cl) (mg/L)	7.29				
	Fluoride (F) (mg/L)	0.161				
	Nitrate (as N) (mg/L)	2.10				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.145 TKNI				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0029				
	Phosphorus (P)-Total (mg/L)	0.0024				
	Sulfate (SO4) (mg/L)	124				
	Anion Sum (meq/L)	6.55				
	Cation Sum (meq/L)	6.70				
	Cation - Anion Balance (%)	1.1				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50				
	Total Organic Carbon (mg/L)	0.59				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	0.00010				
	Arsenic (As)-Total (mg/L)	0.00018				
	Barium (Ba)-Total (mg/L)	0.165				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.012				
	Cadmium (Cd)-Total (ug/L)	0.0208				
	Calcium (Ca)-Total (mg/L)	76.3				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2173527-1				
	Description	WP				
	Sampled Date	27-SEP-18				
	Sampled Time	08:15				
	Client ID	RG_DW-03-04_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00023				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.00346				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	0.000236				
	Lithium (Li)-Total (mg/L)	0.0089				
	Magnesium (Mg)-Total (mg/L)	26.5				
	Manganese (Mn)-Total (mg/L)	0.00011				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00103				
	Nickel (Ni)-Total (mg/L)	0.00102				
	Potassium (K)-Total (mg/L)	0.909				
	Selenium (Se)-Total (ug/L)	12.4				
	Silicon (Si)-Total (mg/L)	2.52				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	6.89				
	Strontium (Sr)-Total (mg/L)	0.170				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00105				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0111				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	0.00011				
	Arsenic (As)-Dissolved (mg/L)	0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.204				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.012				
	Cadmium (Cd)-Dissolved (ug/L)	0.0131				
	Calcium (Ca)-Dissolved (mg/L)	81.9				
	Chromium (Cr)-Dissolved (mg/L)	0.00018				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00074				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2173527-1				
	Description	WP				
	Sampled Date	27-SEP-18				
	Sampled Time	08:15				
	Client ID	RG_DW-03-04_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0093				
	Magnesium (Mg)-Dissolved (mg/L)	27.6				
	Manganese (Mn)-Dissolved (mg/L)	<0.00010				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00108				
	Nickel (Ni)-Dissolved (mg/L)	0.00066				
	Potassium (K)-Dissolved (mg/L)	0.967				
	Selenium (Se)-Dissolved (ug/L)	14.3				
	Silicon (Si)-Dissolved (mg/L)	2.53				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	7.33				
	Strontium (Sr)-Dissolved (mg/L)	0.186				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00101				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0056				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Dissolved Organic Carbon	B	L2173527-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2173527-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2173527-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2173527-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2173527-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2173527-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2173527-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents.

Reference Information

Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

Reference Information

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4257932								
WG2892437-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			107.5		%		85-115	02-OCT-18
WG2892437-1 MB								
Acidity (as CaCO3)			1.9		mg/L		2	02-OCT-18
ALK-TITR-VA	**Water**							
Batch R4259643								
WG2892365-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			101.9		%		85-115	04-OCT-18
WG2892365-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	04-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4258128								
WG2892241-2 LCS								
Beryllium (Be)-Dissolved			99.0		%		80-120	02-OCT-18
WG2892241-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	02-OCT-18
BE-T-L-CCMS-VA	**Water**							
Batch R4259036								
WG2893525-2 LCS								
Beryllium (Be)-Total			93.8		%		80-120	03-OCT-18
WG2893525-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	03-OCT-18
BR-L-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-6 LCS								
Bromide (Br)			102.1		%		85-115	02-OCT-18
WG2892319-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	02-OCT-18
CARBONS-DOC-VA	**Water**							
Batch R4263206								
WG2894306-12 LCS								
Dissolved Organic Carbon			97.9		%		80-120	04-OCT-18
WG2894306-16 LCS								
Dissolved Organic Carbon			104.4		%		80-120	04-OCT-18
WG2894306-4 LCS								
Dissolved Organic Carbon			97.8		%		80-120	04-OCT-18
WG2894306-8 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4263206								
WG2894306-8 LCS								
Dissolved Organic Carbon			97.0		%		80-120	04-OCT-18
WG2894306-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
WG2894306-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
WG2894306-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
WG2894306-7 MB								
Dissolved Organic Carbon			0.68	B	mg/L		0.5	04-OCT-18
WG2894306-14 MS		**L2173527-1**						
Dissolved Organic Carbon			96.3		%		70-130	04-OCT-18
CARBONS-TOC-VA	**Water**							
Batch R4263204								
WG2894305-1 LCS								
Total Organic Carbon			99.0		%		80-120	04-OCT-18
WG2894305-13 LCS								
Total Organic Carbon			102.3		%		80-120	04-OCT-18
WG2894305-5 LCS								
Total Organic Carbon			101.2		%		80-120	04-OCT-18
WG2894305-9 LCS								
Total Organic Carbon			96.7		%		80-120	04-OCT-18
WG2894305-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
WG2894305-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
WG2894305-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-OCT-18
WG2894305-11 MS		**L2173527-1**						
Total Organic Carbon			93.8		%		70-130	04-OCT-18
CL-L-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-6 LCS								
Chloride (Cl)			100.4		%		90-110	02-OCT-18
WG2892319-5 MB								
Chloride (Cl)			<0.10		mg/L		0.1	02-OCT-18
EC-PCT-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-PCT-VA	**Water**							
Batch R4257932								
WG2892437-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			100.9		%		90-110	02-OCT-18
WG2892437-1 MB								
Conductivity			<2.0		uS/cm		2	02-OCT-18
F-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-6 LCS								
Fluoride (F)			99.8		%		90-110	02-OCT-18
WG2892319-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	02-OCT-18
HG-D-CVAA-VA	**Water**							
Batch R4256030								
WG2892605-10 LCS								
Mercury (Hg)-Dissolved			98.7		%		80-120	02-OCT-18
WG2892605-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	02-OCT-18
HG-T-CVAA-VA	**Water**							
Batch R4263798								
WG2897766-2 LCS								
Mercury (Hg)-Total			95.5		%		80-120	07-OCT-18
WG2897766-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	07-OCT-18
MET-D-CCMS-VA	**Water**							
Batch R4258128								
WG2892241-2 LCS								
Aluminum (Al)-Dissolved			102.0		%		80-120	02-OCT-18
Antimony (Sb)-Dissolved			104.7		%		80-120	02-OCT-18
Arsenic (As)-Dissolved			99.4		%		80-120	02-OCT-18
Barium (Ba)-Dissolved			103.1		%		80-120	02-OCT-18
Bismuth (Bi)-Dissolved			108.1		%		80-120	02-OCT-18
Boron (B)-Dissolved			95.4		%		80-120	02-OCT-18
Cadmium (Cd)-Dissolved			98.5		%		80-120	02-OCT-18
Calcium (Ca)-Dissolved			97.4		%		80-120	02-OCT-18
Chromium (Cr)-Dissolved			102.5		%		80-120	02-OCT-18
Cobalt (Co)-Dissolved			101.5		%		80-120	02-OCT-18
Copper (Cu)-Dissolved			101.3		%		80-120	02-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4258128								
WG2892241-2 LCS								
Iron (Fe)-Dissolved			93.1		%		80-120	02-OCT-18
Lead (Pb)-Dissolved			105.5		%		80-120	02-OCT-18
Lithium (Li)-Dissolved			99.8		%		80-120	02-OCT-18
Magnesium (Mg)-Dissolved			102.7		%		80-120	02-OCT-18
Manganese (Mn)-Dissolved			104.8		%		80-120	02-OCT-18
Molybdenum (Mo)-Dissolved			99.0		%		80-120	02-OCT-18
Nickel (Ni)-Dissolved			101.1		%		80-120	02-OCT-18
Potassium (K)-Dissolved			99.4		%		80-120	02-OCT-18
Selenium (Se)-Dissolved			101.6		%		80-120	02-OCT-18
Silicon (Si)-Dissolved			99.8		%		60-140	02-OCT-18
Silver (Ag)-Dissolved			93.5		%		80-120	02-OCT-18
Sodium (Na)-Dissolved			107.5		%		80-120	02-OCT-18
Strontium (Sr)-Dissolved			93.7		%		80-120	02-OCT-18
Thallium (Tl)-Dissolved			110.2		%		80-120	02-OCT-18
Tin (Sn)-Dissolved			99.3		%		80-120	02-OCT-18
Titanium (Ti)-Dissolved			104.4		%		80-120	02-OCT-18
Uranium (U)-Dissolved			94.6		%		80-120	02-OCT-18
Vanadium (V)-Dissolved			106.6		%		80-120	02-OCT-18
Zinc (Zn)-Dissolved			101.7		%		80-120	02-OCT-18
WG2892241-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	02-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	02-OCT-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	02-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	02-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	02-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	02-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4258128								
WG2892241-1 MB		**NP**						
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	02-OCT-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	02-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	02-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	02-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	02-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	02-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	02-OCT-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	02-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	02-OCT-18
MET-T-CCMS-VA	**Water**							
Batch R4259036								
WG2893525-2 LCS								
Aluminum (Al)-Total			101.4		%		80-120	03-OCT-18
Antimony (Sb)-Total			105.4		%		80-120	03-OCT-18
Arsenic (As)-Total			96.5		%		80-120	03-OCT-18
Barium (Ba)-Total			98.8		%		80-120	03-OCT-18
Bismuth (Bi)-Total			98.7		%		80-120	03-OCT-18
Boron (B)-Total			95.9		%		80-120	03-OCT-18
Cadmium (Cd)-Total			100.8		%		80-120	03-OCT-18
Calcium (Ca)-Total			94.5		%		80-120	03-OCT-18
Chromium (Cr)-Total			100.3		%		80-120	03-OCT-18
Cobalt (Co)-Total			99.2		%		80-120	03-OCT-18
Copper (Cu)-Total			97.7		%		80-120	03-OCT-18
Iron (Fe)-Total			97.2		%		80-120	03-OCT-18
Lead (Pb)-Total			97.9		%		80-120	03-OCT-18
Lithium (Li)-Total			91.8		%		80-120	03-OCT-18
Magnesium (Mg)-Total			102.2		%		80-120	03-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4259036								
WG2893525-2 LCS								
Manganese (Mn)-Total			97.3		%		80-120	03-OCT-18
Molybdenum (Mo)-Total			100.3		%		80-120	03-OCT-18
Nickel (Ni)-Total			100.5		%		80-120	03-OCT-18
Potassium (K)-Total			101.1		%		80-120	03-OCT-18
Selenium (Se)-Total			95.1		%		80-120	03-OCT-18
Silicon (Si)-Total			101.9		%		80-120	03-OCT-18
Silver (Ag)-Total			95.3		%		80-120	03-OCT-18
Sodium (Na)-Total			106.0		%		80-120	03-OCT-18
Strontium (Sr)-Total			96.5		%		80-120	03-OCT-18
Thallium (Tl)-Total			95.1		%		80-120	03-OCT-18
Tin (Sn)-Total			101.2		%		80-120	03-OCT-18
Titanium (Ti)-Total			88.8		%		80-120	03-OCT-18
Uranium (U)-Total			99.5		%		80-120	03-OCT-18
Vanadium (V)-Total			102.2		%		80-120	03-OCT-18
Zinc (Zn)-Total			100.9		%		80-120	03-OCT-18
WG2893525-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	03-OCT-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	03-OCT-18
Boron (B)-Total			<0.010		mg/L		0.01	03-OCT-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	03-OCT-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	03-OCT-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	03-OCT-18
Iron (Fe)-Total			<0.010		mg/L		0.01	03-OCT-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-OCT-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	03-OCT-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	03-OCT-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	03-OCT-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	03-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4259036								
WG2893525-1 MB								
Potassium (K)-Total			<0.050		mg/L		0.05	03-OCT-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	03-OCT-18
Silicon (Si)-Total			<0.10		mg/L		0.1	03-OCT-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	03-OCT-18
Sodium (Na)-Total			<0.050		mg/L		0.05	03-OCT-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	03-OCT-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	03-OCT-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	03-OCT-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	03-OCT-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	03-OCT-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	03-OCT-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	03-OCT-18
NH3-F-VA	**Water**							
Batch R4259545								
WG2894730-6 LCS								
Ammonia, Total (as N)			101.2		%		85-115	04-OCT-18
WG2894730-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	04-OCT-18
NO2-L-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-6 LCS								
Nitrite (as N)			100.5		%		90-110	02-OCT-18
WG2892319-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	02-OCT-18
NO3-L-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-6 LCS								
Nitrate (as N)			100.7		%		90-110	02-OCT-18
WG2892319-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	02-OCT-18
ORP-VA	**Water**							
Batch R4263777								
WG2897722-1 CRM		**VA-ORP**						
ORP			218		mV		210-230	07-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-PRES-COL-VA	**Water**							
Batch R4257952								
WG2892451-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			99.5		%		80-120	02-OCT-18
WG2892451-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	02-OCT-18
WG2892451-4 MS		**L2173527-1**						
Phosphorus (P)-Total			106.7		%		70-130	02-OCT-18
PH-PCT-VA	**Water**							
Batch R4257932								
WG2892437-2 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	02-OCT-18
PO4-DO-COL-VA	**Water**							
Batch R4255810								
WG2892361-6 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			102.1		%		80-120	02-OCT-18
WG2892361-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-OCT-18
SO4-IC-N-VA	**Water**							
Batch R4258730								
WG2892319-6 LCS								
Sulfate (SO4)			101.1		%		90-110	02-OCT-18
WG2892319-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	02-OCT-18
TDS-LOW-VA	**Water**							
Batch R4262853								
WG2894889-5 LCS								
Total Dissolved Solids			97.8		%		85-115	04-OCT-18
WG2894889-4 MB								
Total Dissolved Solids			<3.0		mg/L		3	04-OCT-18
TKN-F-VA	**Water**							
Batch R4258829								
WG2892925-10 LCS								
Total Kjeldahl Nitrogen			98.4		%		75-125	03-OCT-18
WG2892925-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	03-OCT-18
WG2892925-12 MS		**L2173527-1**						
Total Kjeldahl Nitrogen			100.7		%		70-130	03-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-LOW-VA	**Water**							
Batch R4259349								
WG2894763-2 LCS								
Total Suspended Solids			88.4		%		85-115	04-OCT-18
WG2894763-1 MB								
Total Suspended Solids			<1.0		mg/L		1	04-OCT-18
TURBIDITY-VA	**Water**							
Batch R4258365								
WG2893761-2 CRM		**VA-FORM-40**						
Turbidity			99.5		%		85-115	03-OCT-00
WG2893761-1 MB								
Turbidity			<0.10		NTU		0.1	03-OCT-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	27-SEP-18 08:15	07-OCT-18 13:00	0.25	245	hours	EHTR-FM
Turbidity by Meter							
	1	27-SEP-18 08:15	03-OCT-18 09:00	3	6	days	EHTR
pH by Meter (Automated)							
	1	27-SEP-18 08:15	02-OCT-18 20:15	0.25	132	hours	EHTR-FM
Anions and Nutrients							
Diss. Orthophosphate in Water by Colour							
	1	27-SEP-18 08:15	02-OCT-18 04:33	3	5	days	EHTR
Nitrate in Water by IC (Low Level)							
	1	27-SEP-18 08:15	02-OCT-18 07:08	3	5	days	EHTR
Nitrite in Water by IC (Low Level)							
	1	27-SEP-18 08:15	02-OCT-18 07:08	3	5	days	EHTR

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2173527 were received on 01-OCT-18 08:50.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 03-04_2018-09-27 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Can Dang			Email 1:	cait.good@teck.com	X	X	X
Email	cait.good@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	8081 Lougheed Hwy			Email 3:	colleen.mooney@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-425-8202			Phone Number	604-253-4188			PO number	VPO00554397			

L2173527-COFC

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Fil.	F	N	F	N	F	N	N					
								PRESERV.	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3					
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-03-04_WP_Q3-2018_NP	RG_DW-03-04	WP	no	27-Sep-18	0815	G	~~#NAME?~~ 2		1	1	1	1	1	1	1					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Ryan Schopman	180727/1200	6.1 Hayat	10/1/18 650

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Sampler's Signature		Date/Time	September 26, 2018

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 28-SEP-18
Report Date: 05-OCT-18 17:51 (MT)
Version: FINAL

Client Phone: 250-425-8209

Certificate of Analysis

Lab Work Order #: L2172868

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 07-01_2018-09-26
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2172868-1				
	Description	WP				
	Sampled Date	26-SEP-18				
	Sampled Time	11:45				
	Client ID	RG_DW-07-01_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	1560				
	Hardness (as CaCO3) (mg/L)	899				
	pH (pH)	7.60				
	ORP (mV)	323				
	Total Suspended Solids (mg/L)	3.2				
	Total Dissolved Solids (mg/L)	1230				
	Turbidity (NTU)	2.20				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	8.7				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	308				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	308				
	Ammonia, Total (as N) (mg/L)	0.0056				
	Bromide (Br) (mg/L)	<0.25 DLDS				
	Chloride (Cl) (mg/L)	17.7				
	Fluoride (F) (mg/L)	0.16				
	Nitrate (as N) (mg/L)	3.54				
	Nitrite (as N) (mg/L)	<0.0050 DLDS				
	Total Kjeldahl Nitrogen (mg/L)	0.169 TKNI				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0017				
	Phosphorus (P)-Total (mg/L)	0.0056				
	Sulfate (SO4) (mg/L)	607				
	Anion Sum (meq/L)	19.6				
	Cation Sum (meq/L)	19.5				
	Cation - Anion Balance (%)	-0.3				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.95				
	Total Organic Carbon (mg/L)	1.05				
Total Metals	Aluminum (Al)-Total (mg/L)	0.0271				
	Antimony (Sb)-Total (mg/L)	0.00029				
	Arsenic (As)-Total (mg/L)	0.00027				
	Barium (Ba)-Total (mg/L)	0.126				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.083				
	Cadmium (Cd)-Total (ug/L)	0.0606				
	Calcium (Ca)-Total (mg/L)	220				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2172868-1				
	Description	WP				
	Sampled Date	26-SEP-18				
	Sampled Time	11:45				
	Client ID	RG_DW-07-01_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00030				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.00143				
	Iron (Fe)-Total (mg/L)	0.382				
	Lead (Pb)-Total (mg/L)	0.000122				
	Lithium (Li)-Total (mg/L)	0.0357				
	Magnesium (Mg)-Total (mg/L)	92.3				
	Manganese (Mn)-Total (mg/L)	0.0180				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.000967				
	Nickel (Ni)-Total (mg/L)	0.00077				
	Potassium (K)-Total (mg/L)	2.86				
	Selenium (Se)-Total (ug/L)	9.37				
	Silicon (Si)-Total (mg/L)	3.58				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	34.4				
	Strontium (Sr)-Total (mg/L)	0.705				
	Thallium (Tl)-Total (mg/L)	0.000019				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00340				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0293				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	0.00027				
	Arsenic (As)-Dissolved (mg/L)	0.00018				
	Barium (Ba)-Dissolved (mg/L)	0.125				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.075				
	Cadmium (Cd)-Dissolved (ug/L)	0.0544				
	Calcium (Ca)-Dissolved (mg/L)	214				
	Chromium (Cr)-Dissolved (mg/L)	0.00019				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00073				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2172868-1				
	Description	WP				
	Sampled Date	26-SEP-18				
	Sampled Time	11:45				
	Client ID	RG_DW-07-01_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	0.181				
	Lead (Pb)-Dissolved (mg/L)	0.000091				
	Lithium (Li)-Dissolved (mg/L)	0.0334				
	Magnesium (Mg)-Dissolved (mg/L)	88.6				
	Manganese (Mn)-Dissolved (mg/L)	0.0139				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00104				
	Nickel (Ni)-Dissolved (mg/L)	0.00054				
	Potassium (K)-Dissolved (mg/L)	2.83				
	Selenium (Se)-Dissolved (ug/L)	9.49				
	Silicon (Si)-Dissolved (mg/L)	3.20				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	32.6				
	Strontium (Sr)-Dissolved (mg/L)	0.734				
	Thallium (Tl)-Dissolved (mg/L)	0.000018				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00357				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0427 DTC				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Total Organic Carbon	MS-B	L2172868-1
Matrix Spike	Fluoride (F)	MS-B	L2172868-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2172868-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2172868-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2172868-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2172868-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2172868-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2172868-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2172868-1
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L2172868-1
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2172868-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2172868-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2172868-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2172868-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2172868-1
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2172868-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2172868-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2172868-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2172868-1
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2172868-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2172868-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2172868-1
Matrix Spike	Uranium (U)-Total	MS-B	L2172868-1
Matrix Spike	Sulfate (SO4)	MS-B	L2172868-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

Reference Information

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA Water Total organic carbon by combustion APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA Water Chloride in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

Reference Information

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

07-01_2018-09-26

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4254968								
WG2890806-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			102.4		%		85-115	02-OCT-18
WG2890806-1 MB								
Acidity (as CaCO3)			1.9		mg/L		2	02-OCT-18
ALK-TITR-VA	**Water**							
Batch R4252690								
WG2890807-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			102.8		%		85-115	01-OCT-18
WG2890807-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	01-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4256497								
WG2890895-2 LCS								
Beryllium (Be)-Dissolved			97.5		%		80-120	30-SEP-18
WG2890895-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	30-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4257726								
WG2891754-2 LCS								
Beryllium (Be)-Total			106.3		%		80-120	01-OCT-18
WG2891754-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	01-OCT-18
BR-L-IC-N-VA	**Water**							
Batch R4259713								
WG2890812-2 LCS								
Bromide (Br)			102.6		%		85-115	30-SEP-18
WG2890812-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	30-SEP-18
CARBONS-DOC-VA	**Water**							
Batch R4260003								
WG2893623-4 LCS								
Dissolved Organic Carbon			99.8		%		80-120	03-OCT-18
WG2893623-8 LCS								
Dissolved Organic Carbon			98.1		%		80-120	03-OCT-18
WG2893623-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	03-OCT-18
WG2893623-7 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4260003								
WG2893623-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	03-OCT-18
CARBONS-TOC-VA	**Water**							
Batch R4260002								
WG2893622-1 LCS								
Total Organic Carbon			94.6		%		80-120	03-OCT-18
WG2893622-13 LCS								
Total Organic Carbon			102.1		%		80-120	03-OCT-18
WG2893622-5 LCS								
Total Organic Carbon			95.7		%		80-120	03-OCT-18
WG2893622-9 LCS								
Total Organic Carbon			95.3		%		80-120	03-OCT-18
WG2893622-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	03-OCT-18
WG2893622-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	03-OCT-18
WG2893622-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	03-OCT-18
CL-L-IC-N-VA	**Water**							
Batch R4259713								
WG2890812-2 LCS								
Chloride (Cl)			100.7		%		90-110	30-SEP-18
WG2890812-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	30-SEP-18
EC-PCT-VA	**Water**							
Batch R4254968								
WG2890806-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			100.6		%		90-110	02-OCT-18
WG2890806-1 MB								
Conductivity			<2.0		uS/cm		2	02-OCT-18
F-IC-N-VA	**Water**							
Batch R4259713								
WG2890812-2 LCS								
Fluoride (F)			99.9		%		90-110	30-SEP-18
WG2890812-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	30-SEP-18
	Water							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R4258670								
WG2890491-18 LCS								
Mercury (Hg)-Dissolved			106.3		%		80-120	03-OCT-18
WG2890491-17 MB								
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	03-OCT-18
HG-T-CVAA-VA	**Water**							
Batch R4259155								
WG2894923-2 LCS								
Mercury (Hg)-Total			98.6		%		80-120	04-OCT-18
WG2894923-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	04-OCT-18
MET-D-CCMS-VA	**Water**							
Batch R4256497								
WG2890895-2 LCS								
Aluminum (Al)-Dissolved			103.4		%		80-120	30-SEP-18
Antimony (Sb)-Dissolved			98.7		%		80-120	30-SEP-18
Arsenic (As)-Dissolved			99.4		%		80-120	30-SEP-18
Barium (Ba)-Dissolved			98.8		%		80-120	30-SEP-18
Bismuth (Bi)-Dissolved			99.6		%		80-120	30-SEP-18
Boron (B)-Dissolved			99.8		%		80-120	30-SEP-18
Cadmium (Cd)-Dissolved			98.3		%		80-120	30-SEP-18
Calcium (Ca)-Dissolved			97.3		%		80-120	30-SEP-18
Chromium (Cr)-Dissolved			100.6		%		80-120	30-SEP-18
Cobalt (Co)-Dissolved			97.7		%		80-120	30-SEP-18
Copper (Cu)-Dissolved			96.6		%		80-120	30-SEP-18
Iron (Fe)-Dissolved			95.3		%		80-120	30-SEP-18
Lead (Pb)-Dissolved			98.5		%		80-120	30-SEP-18
Lithium (Li)-Dissolved			99.7		%		80-120	30-SEP-18
Magnesium (Mg)-Dissolved			102.6		%		80-120	30-SEP-18
Manganese (Mn)-Dissolved			98.0		%		80-120	30-SEP-18
Molybdenum (Mo)-Dissolved			102.1		%		80-120	30-SEP-18
Nickel (Ni)-Dissolved			99.4		%		80-120	30-SEP-18
Potassium (K)-Dissolved			106.5		%		80-120	30-SEP-18
Selenium (Se)-Dissolved			100.3		%		80-120	30-SEP-18
Silicon (Si)-Dissolved			98.8		%		60-140	30-SEP-18
Silver (Ag)-Dissolved			94.3		%		80-120	30-SEP-18
Sodium (Na)-Dissolved			99.2		%		80-120	30-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4256497								
WG2890895-2 LCS								
Strontium (Sr)-Dissolved			103.9		%		80-120	30-SEP-18
Thallium (Tl)-Dissolved			99.2		%		80-120	30-SEP-18
Tin (Sn)-Dissolved			97.3		%		80-120	30-SEP-18
Titanium (Ti)-Dissolved			94.9		%		80-120	30-SEP-18
Uranium (U)-Dissolved			100.8		%		80-120	30-SEP-18
Vanadium (V)-Dissolved			100.0		%		80-120	30-SEP-18
WG2890895-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	30-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	30-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	30-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	30-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	30-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	30-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	30-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	30-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	30-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	30-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	30-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	30-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	30-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	30-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	30-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	30-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	30-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	30-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	30-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	30-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	30-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4256497								
WG2890895-1 MB		**NP**						
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	30-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	30-SEP-18
Batch R4258154								
WG2893265-2 LCS								
Aluminum (Al)-Dissolved			113.1		%		80-120	02-OCT-18
Antimony (Sb)-Dissolved			97.3		%		80-120	02-OCT-18
Arsenic (As)-Dissolved			105.2		%		80-120	02-OCT-18
Barium (Ba)-Dissolved			106.7		%		80-120	02-OCT-18
Bismuth (Bi)-Dissolved			101.9		%		80-120	02-OCT-18
Boron (B)-Dissolved			99.9		%		80-120	02-OCT-18
Cadmium (Cd)-Dissolved			106.0		%		80-120	02-OCT-18
Calcium (Ca)-Dissolved			100.4		%		80-120	02-OCT-18
Chromium (Cr)-Dissolved			106.2		%		80-120	02-OCT-18
Cobalt (Co)-Dissolved			107.8		%		80-120	02-OCT-18
Copper (Cu)-Dissolved			105.3		%		80-120	02-OCT-18
Iron (Fe)-Dissolved			103.1		%		80-120	02-OCT-18
Lead (Pb)-Dissolved			103.1		%		80-120	02-OCT-18
Lithium (Li)-Dissolved			97.8		%		80-120	02-OCT-18
Magnesium (Mg)-Dissolved			110.4		%		80-120	02-OCT-18
Manganese (Mn)-Dissolved			112.2		%		80-120	02-OCT-18
Molybdenum (Mo)-Dissolved			98.0		%		80-120	02-OCT-18
Nickel (Ni)-Dissolved			105.5		%		80-120	02-OCT-18
Potassium (K)-Dissolved			103.6		%		80-120	02-OCT-18
Selenium (Se)-Dissolved			101.9		%		80-120	02-OCT-18
Silicon (Si)-Dissolved			108.5		%		60-140	02-OCT-18
Silver (Ag)-Dissolved			94.9		%		80-120	02-OCT-18
Sodium (Na)-Dissolved			108.5		%		80-120	02-OCT-18
Strontium (Sr)-Dissolved			99.95		%		80-120	02-OCT-18
Thallium (Tl)-Dissolved			104.4		%		80-120	02-OCT-18
Tin (Sn)-Dissolved			99.3		%		80-120	02-OCT-18
Titanium (Ti)-Dissolved			99.4		%		80-120	02-OCT-18
Uranium (U)-Dissolved			105.9		%		80-120	02-OCT-18
Vanadium (V)-Dissolved			105.6		%		80-120	02-OCT-18
Zinc (Zn)-Dissolved			108.2		%		80-120	02-OCT-18
WG2893265-1		**NP**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4258154								
WG2893265-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	02-OCT-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	02-OCT-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	02-OCT-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	02-OCT-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	02-OCT-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	02-OCT-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	02-OCT-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	02-OCT-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	02-OCT-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	02-OCT-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	02-OCT-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	02-OCT-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	02-OCT-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	02-OCT-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	02-OCT-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	02-OCT-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	02-OCT-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	02-OCT-18
MET-T-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4257726								
WG2891754-2 LCS								
Aluminum (Al)-Total			113.9		%		80-120	01-OCT-18
Antimony (Sb)-Total			108.7		%		80-120	01-OCT-18
Arsenic (As)-Total			110.7		%		80-120	01-OCT-18
Barium (Ba)-Total			110.5		%		80-120	01-OCT-18
Bismuth (Bi)-Total			100.8		%		80-120	01-OCT-18
Boron (B)-Total			104.5		%		80-120	01-OCT-18
Cadmium (Cd)-Total			110.7		%		80-120	01-OCT-18
Calcium (Ca)-Total			103.7		%		80-120	01-OCT-18
Chromium (Cr)-Total			114.4		%		80-120	01-OCT-18
Cobalt (Co)-Total			111.1		%		80-120	01-OCT-18
Copper (Cu)-Total			111.1		%		80-120	01-OCT-18
Iron (Fe)-Total			104.1		%		80-120	01-OCT-18
Lead (Pb)-Total			103.2		%		80-120	01-OCT-18
Lithium (Li)-Total			105.8		%		80-120	01-OCT-18
Magnesium (Mg)-Total			108.4		%		80-120	01-OCT-18
Manganese (Mn)-Total			109.2		%		80-120	01-OCT-18
Molybdenum (Mo)-Total			109.5		%		80-120	01-OCT-18
Nickel (Ni)-Total			111.0		%		80-120	01-OCT-18
Potassium (K)-Total			114.8		%		80-120	01-OCT-18
Selenium (Se)-Total			101.6		%		80-120	01-OCT-18
Silicon (Si)-Total			108.9		%		80-120	01-OCT-18
Silver (Ag)-Total			102.5		%		80-120	01-OCT-18
Sodium (Na)-Total			112.1		%		80-120	01-OCT-18
Strontium (Sr)-Total			104.7		%		80-120	01-OCT-18
Thallium (Tl)-Total			104.2		%		80-120	01-OCT-18
Tin (Sn)-Total			104.2		%		80-120	01-OCT-18
Titanium (Ti)-Total			102.0		%		80-120	01-OCT-18
Uranium (U)-Total			102.4		%		80-120	01-OCT-18
Vanadium (V)-Total			114.3		%		80-120	01-OCT-18
Zinc (Zn)-Total			115.1		%		80-120	01-OCT-18
WG2891754-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	01-OCT-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	01-OCT-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4257726								
WG2891754-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	01-OCT-18
Boron (B)-Total			<0.010		mg/L		0.01	01-OCT-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	01-OCT-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	01-OCT-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	01-OCT-18
Iron (Fe)-Total			<0.010		mg/L		0.01	01-OCT-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	01-OCT-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	01-OCT-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	01-OCT-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	01-OCT-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	01-OCT-18
Potassium (K)-Total			<0.050		mg/L		0.05	01-OCT-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	01-OCT-18
Silicon (Si)-Total			<0.10		mg/L		0.1	01-OCT-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	01-OCT-18
Sodium (Na)-Total			<0.050		mg/L		0.05	01-OCT-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	01-OCT-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	01-OCT-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	01-OCT-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	01-OCT-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	01-OCT-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	01-OCT-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	01-OCT-18
NH3-F-VA	**Water**							
Batch R4258734								
WG2893373-10 LCS								
Ammonia, Total (as N)			101.3		%		85-115	03-OCT-18
WG2893373-9 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	03-OCT-18
NO2-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-VA	**Water**							
Batch R4259713								
WG2890812-2 LCS								
Nitrite (as N)			99.97		%		90-110	30-SEP-18
WG2890812-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	30-SEP-18
NO3-L-IC-N-VA	**Water**							
Batch R4259713								
WG2890812-2 LCS								
Nitrate (as N)			100.8		%		90-110	30-SEP-18
WG2890812-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	30-SEP-18
ORP-VA	**Water**							
Batch R4259557								
WG2894934-1 CRM		**VA-ORP**						
ORP			218		mV		210-230	04-OCT-18
P-T-PRES-COL-VA	**Water**							
Batch R4254276								
WG2890887-6 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			100.9		%		80-120	30-SEP-18
WG2890887-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	30-SEP-18
PH-PCT-VA	**Water**							
Batch R4254968								
WG2890806-2 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	02-OCT-18
PO4-DO-COL-VA	**Water**							
Batch R4251670								
WG2890499-34 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			98.7		%		80-120	29-SEP-18
WG2890499-33 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	29-SEP-18
SO4-IC-N-VA	**Water**							
Batch R4259713								
WG2890812-2 LCS								
Sulfate (SO4)			101.6		%		90-110	30-SEP-18
WG2890812-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-VA	**Water**							
Batch R4259713								
WG2890812-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	30-SEP-18
TDS-LOW-VA	**Water**							
Batch R4258531								
WG2892447-2 LCS								
Total Dissolved Solids			102.2		%		85-115	02-OCT-18
WG2892447-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	02-OCT-18
TKN-F-VA	**Water**							
Batch R4257967								
WG2892223-6 LCS								
Total Kjeldahl Nitrogen			99.4		%		75-125	02-OCT-18
WG2892223-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	02-OCT-18
TSS-LOW-VA	**Water**							
Batch R4257673								
WG2892307-8 LCS								
Total Suspended Solids			95.1		%		85-115	01-OCT-18
WG2892307-7 MB								
Total Suspended Solids			<1.0		mg/L		1	01-OCT-18
TURBIDITY-VA	**Water**							
Batch R4251902								
WG2890875-2 CRM		**VA-FORM-40**						
Turbidity			103.5		%		85-115	29-SEP-18
WG2890875-1 MB								
Turbidity			<0.10		NTU		0.1	29-SEP-18

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	26-SEP-18 11:45	04-OCT-18 08:00	0.25	188	hours	EHTR-FM
pH by Meter (Automated)							
	1	26-SEP-18 11:45	01-OCT-18 08:23	0.25	117	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	26-SEP-18 11:45	30-SEP-18 08:40	3	4	days	EHT
Nitrite in Water by IC (Low Level)							
	1	26-SEP-18 11:45	30-SEP-18 08:40	3	4	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2172868 were received on 28-SEP-18 09:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 07-01_2018-09-26 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Can Dang			Email 1:	cait.good@teck.com	X	X	X
Email	cait.good@teck.com			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	8081 Lougheed Hwy			Email 3:	colleen.mooney@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-425-8202			Phone Number	604-253-4188			PO number	VPO00554397			

L2172868-COFC

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Fltr.	F	N	F	N	F	N	N					
								PRESERV.	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3					
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-07-01_WP_Q3-2018_NP	RG_DW-07-01	WP	no	26-Sep-18	1145	G	#NAME?		1	1	1	1	1	1	1					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
		180926/1630	SC 2°C	9/28/18 910AM

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	September 26, 2018
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

custody seal intact

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 27-SEP-18
Report Date: 04-OCT-18 15:46 (MT)
Version: FINAL

Client Phone: 250-425-8209

Certificate of Analysis

Lab Work Order #: L2171832

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 01-07_2018-09-25
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2171832-1				
	Description	WATER				
	Sampled Date	25-SEP-18				
	Sampled Time	12:00				
	Client ID	RD_DW_01-07_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	779				
	Hardness (as CaCO3) (mg/L)	430				
	pH (pH)	7.96				
	ORP (mV)	499				
	Total Suspended Solids (mg/L)	1.1				
	Total Dissolved Solids (mg/L)	476				
	Turbidity (NTU)	0.23				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	7.7				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	386				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	386				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.25 DLDS				
	Chloride (Cl) (mg/L)	3.81				
	Fluoride (F) (mg/L)	<0.10 DLDS				
	Nitrate (as N) (mg/L)	0.712				
	Nitrite (as N) (mg/L)	<0.0050 DLDS				
	Total Kjeldahl Nitrogen (mg/L)	0.151				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0013				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	63.7				
	Anion Sum (meq/L)	9.19				
	Cation Sum (meq/L)	8.85				
	Cation - Anion Balance (%)	-1.9				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.73				
	Total Organic Carbon (mg/L)	0.83				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00011				
	Barium (Ba)-Total (mg/L)	0.125				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.020				
	Cadmium (Cd)-Total (ug/L)	0.0432				
	Calcium (Ca)-Total (mg/L)	104				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2171832-1				
	Description	WATER				
	Sampled Date	25-SEP-18				
	Sampled Time	12:00				
	Client ID	RD_DW_01-07_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00019				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.00112				
	Iron (Fe)-Total (mg/L)	0.017				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	0.0068				
	Magnesium (Mg)-Total (mg/L)	40.7				
	Manganese (Mn)-Total (mg/L)	0.00027				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00373				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Potassium (K)-Total (mg/L)	0.887				
	Selenium (Se)-Total (ug/L)	1.61				
	Silicon (Si)-Total (mg/L)	6.87				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	5.21				
	Strontium (Sr)-Total (mg/L)	0.284				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00159				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0049				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.122				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.018				
	Cadmium (Cd)-Dissolved (ug/L)	0.0434				
	Calcium (Ca)-Dissolved (mg/L)	109				
	Chromium (Cr)-Dissolved (mg/L)	0.00020				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				
	Copper (Cu)-Dissolved (mg/L)	0.00100				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2171832-1				
	Description	WATER				
	Sampled Date	25-SEP-18				
	Sampled Time	12:00				
	Client ID	RD_DW_01-07_WP_Q3-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0068				
	Magnesium (Mg)-Dissolved (mg/L)	38.6				
	Manganese (Mn)-Dissolved (mg/L)	0.00015				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00364				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	0.908				
	Selenium (Se)-Dissolved (ug/L)	1.82				
	Silicon (Si)-Dissolved (mg/L)	6.50				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	5.39				
	Strontium (Sr)-Dissolved (mg/L)	0.288				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00166				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0047				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2171832-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2171832-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2171832-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2171832-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2171832-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2171832-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2171832-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2171832-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2171832-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2171832-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2171832-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA Water Oxidation reduction potential by Elect. ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Reference Information

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

01-07_2018-09-25

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4258470								
WG2892161-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			102.6		%		85-115	04-OCT-18
WG2892161-1 MB								
Acidity (as CaCO3)			1.6		mg/L		2	04-OCT-18
ALK-TITR-VA	**Water**							
Batch R4258179								
WG2892329-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			101.6		%		85-115	03-OCT-18
WG2892329-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	03-OCT-18
BE-D-L-CCMS-VA	**Water**							
Batch R4251450								
WG2889164-2 LCS								
Beryllium (Be)-Dissolved			96.6		%		80-120	28-SEP-18
WG2889164-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	28-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4252068								
WG2890522-2 LCS								
Beryllium (Be)-Total			99.9		%		80-120	30-SEP-18
WG2890522-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	30-SEP-18
BR-L-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Bromide (Br)			101.6		%		85-115	27-SEP-18
WG2889202-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	27-SEP-18
CARBONS-DOC-VA	**Water**							
Batch R4258868								
WG2892446-12 LCS								
Dissolved Organic Carbon			96.7		%		80-120	02-OCT-18
WG2892446-16 LCS								
Dissolved Organic Carbon			97.0		%		80-120	02-OCT-18
WG2892446-4 LCS								
Dissolved Organic Carbon			97.8		%		80-120	02-OCT-18
WG2892446-8 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R4258868								
WG2892446-8 LCS								
Dissolved Organic Carbon			98.6		%		80-120	02-OCT-18
WG2892446-11 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892446-15 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892446-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892446-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
CARBONS-TOC-VA	**Water**							
Batch R4258865								
WG2892445-1 LCS								
Total Organic Carbon			93.9		%		80-120	02-OCT-18
WG2892445-13 LCS								
Total Organic Carbon			93.1		%		80-120	02-OCT-18
WG2892445-17 LCS								
Total Organic Carbon			93.0		%		80-120	02-OCT-18
WG2892445-21 LCS								
Total Organic Carbon			94.0		%		80-120	02-OCT-18
WG2892445-5 LCS								
Total Organic Carbon			92.0		%		80-120	02-OCT-18
WG2892445-9 LCS								
Total Organic Carbon			93.2		%		80-120	02-OCT-18
WG2892445-12 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892445-16 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892445-20 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892445-4 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
WG2892445-8 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-18
CL-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-L-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Chloride (Cl)			100.1		%		90-110	27-SEP-18
WG2889202-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	27-SEP-18
EC-PCT-VA	**Water**							
Batch R4258179								
WG2892329-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			102.9		%		90-110	03-OCT-18
WG2892329-1 MB								
Conductivity			<2.0		uS/cm		2	03-OCT-18
F-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Fluoride (F)			100.5		%		90-110	27-SEP-18
WG2889202-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	27-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4249672								
WG2889518-10 LCS								
Mercury (Hg)-Dissolved			98.2		%		80-120	28-SEP-18
WG2889518-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	28-SEP-18
HG-T-CVAA-VA	**Water**							
Batch R4258670								
WG2894274-2 LCS								
Mercury (Hg)-Total			96.4		%		80-120	03-OCT-18
WG2894274-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	03-OCT-18
MET-D-CCMS-VA	**Water**							
Batch R4251450								
WG2889164-2 LCS								
Aluminum (Al)-Dissolved			103.5		%		80-120	28-SEP-18
Antimony (Sb)-Dissolved			97.1		%		80-120	28-SEP-18
Arsenic (As)-Dissolved			99.4		%		80-120	28-SEP-18
Barium (Ba)-Dissolved			98.0		%		80-120	28-SEP-18
Bismuth (Bi)-Dissolved			96.8		%		80-120	28-SEP-18
Boron (B)-Dissolved			95.3		%		80-120	28-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4251450								
WG2889164-2 LCS								
Cadmium (Cd)-Dissolved			97.1		%		80-120	28-SEP-18
Calcium (Ca)-Dissolved			96.1		%		80-120	28-SEP-18
Chromium (Cr)-Dissolved			98.5		%		80-120	28-SEP-18
Cobalt (Co)-Dissolved			97.2		%		80-120	28-SEP-18
Copper (Cu)-Dissolved			95.8		%		80-120	28-SEP-18
Iron (Fe)-Dissolved			98.3		%		80-120	28-SEP-18
Lead (Pb)-Dissolved			96.2		%		80-120	28-SEP-18
Lithium (Li)-Dissolved			97.8		%		80-120	28-SEP-18
Magnesium (Mg)-Dissolved			101.6		%		80-120	28-SEP-18
Manganese (Mn)-Dissolved			99.3		%		80-120	28-SEP-18
Molybdenum (Mo)-Dissolved			97.6		%		80-120	28-SEP-18
Nickel (Ni)-Dissolved			99.9		%		80-120	28-SEP-18
Potassium (K)-Dissolved			101.7		%		80-120	28-SEP-18
Selenium (Se)-Dissolved			92.7		%		80-120	28-SEP-18
Silicon (Si)-Dissolved			96.5		%		60-140	28-SEP-18
Silver (Ag)-Dissolved			94.9		%		80-120	28-SEP-18
Sodium (Na)-Dissolved			105.7		%		80-120	28-SEP-18
Strontium (Sr)-Dissolved			100.3		%		80-120	28-SEP-18
Thallium (Tl)-Dissolved			96.4		%		80-120	28-SEP-18
Tin (Sn)-Dissolved			95.3		%		80-120	28-SEP-18
Titanium (Ti)-Dissolved			96.3		%		80-120	28-SEP-18
Uranium (U)-Dissolved			97.6		%		80-120	28-SEP-18
Vanadium (V)-Dissolved			100.1		%		80-120	28-SEP-18
Zinc (Zn)-Dissolved			96.8		%		80-120	28-SEP-18
WG2889164-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	28-SEP-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	28-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4251450								
WG2889164-1 MB		**NP**						
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	28-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	28-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	28-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	28-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	28-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	28-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	28-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	28-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	28-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	28-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	28-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	28-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4252068								
WG2890522-2 LCS								
Aluminum (Al)-Total			98.0		%		80-120	30-SEP-18
Antimony (Sb)-Total			97.9		%		80-120	30-SEP-18
Arsenic (As)-Total			98.8		%		80-120	30-SEP-18
Barium (Ba)-Total			99.1		%		80-120	30-SEP-18
Bismuth (Bi)-Total			97.8		%		80-120	30-SEP-18
Boron (B)-Total			99.7		%		80-120	30-SEP-18
Cadmium (Cd)-Total			95.1		%		80-120	30-SEP-18
Calcium (Ca)-Total			96.6		%		80-120	30-SEP-18
Chromium (Cr)-Total			98.3		%		80-120	30-SEP-18
Cobalt (Co)-Total			96.2		%		80-120	30-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4252068								
WG2890522-2 LCS								
Copper (Cu)-Total			94.2		%		80-120	30-SEP-18
Iron (Fe)-Total			98.2		%		80-120	30-SEP-18
Lead (Pb)-Total			95.4		%		80-120	30-SEP-18
Lithium (Li)-Total			95.4		%		80-120	30-SEP-18
Magnesium (Mg)-Total			104.8		%		80-120	30-SEP-18
Manganese (Mn)-Total			97.1		%		80-120	30-SEP-18
Molybdenum (Mo)-Total			97.0		%		80-120	30-SEP-18
Nickel (Ni)-Total			96.0		%		80-120	30-SEP-18
Potassium (K)-Total			95.6		%		80-120	30-SEP-18
Selenium (Se)-Total			95.2		%		80-120	30-SEP-18
Silicon (Si)-Total			100.2		%		80-120	30-SEP-18
Silver (Ag)-Total			95.0		%		80-120	30-SEP-18
Sodium (Na)-Total			96.1		%		80-120	30-SEP-18
Strontium (Sr)-Total			95.3		%		80-120	30-SEP-18
Thallium (Tl)-Total			98.7		%		80-120	30-SEP-18
Tin (Sn)-Total			95.3		%		80-120	30-SEP-18
Titanium (Ti)-Total			95.8		%		80-120	30-SEP-18
Uranium (U)-Total			95.5		%		80-120	30-SEP-18
Vanadium (V)-Total			99.7		%		80-120	30-SEP-18
Zinc (Zn)-Total			96.7		%		80-120	30-SEP-18
WG2890522-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	30-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	30-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	30-SEP-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	30-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	30-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	30-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	30-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	30-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4252068								
WG2890522-1 MB								
Lithium (Li)-Total			<0.0010		mg/L		0.001	30-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	30-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	30-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	30-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	30-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	30-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	30-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	30-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	30-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	30-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	30-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	30-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	30-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	30-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	30-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	30-SEP-18
NH3-F-VA	**Water**							
Batch R4258020								
WG2892267-6 LCS								
Ammonia, Total (as N)			97.1		%		85-115	03-OCT-18
WG2892267-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	03-OCT-18
NO2-L-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Nitrite (as N)			100.2		%		90-110	27-SEP-18
WG2889202-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	27-SEP-18
NO3-L-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Nitrate (as N)			100.6		%		90-110	27-SEP-18
WG2889202-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	27-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ORP-VA	**Water**							
Batch R4259557								
WG2894934-1 CRM		**VA-ORP**						
ORP			218		mV		210-230	04-OCT-18
P-T-PRES-COL-VA	**Water**							
Batch R4249367								
WG2889228-18 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			104.8		%		80-120	28-SEP-18
WG2889228-17 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	28-SEP-18
PH-PCT-VA	**Water**							
Batch R4258179								
WG2892329-2 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	03-OCT-18
PO4-DO-COL-VA	**Water**							
Batch R4249530								
WG2889343-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			98.6		%		80-120	28-SEP-18
WG2889343-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	28-SEP-18
SO4-IC-N-VA	**Water**							
Batch R4250687								
WG2889202-2 LCS								
Sulfate (SO4)			101.0		%		90-110	27-SEP-18
WG2889202-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	27-SEP-18
TDS-LOW-VA	**Water**							
Batch R4258531								
WG2892447-2 LCS								
Total Dissolved Solids			102.2		%		85-115	02-OCT-18
WG2892447-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	02-OCT-18
TKN-F-VA	**Water**							
Batch R4254010								
WG2889250-6 LCS								
Total Kjeldahl Nitrogen			104.1		%		75-125	01-OCT-18
WG2889250-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-F-VA	**Water**							
Batch R4254010								
WG2889250-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	01-OCT-18
TSS-LOW-VA	**Water**							
Batch R4257673								
WG2892307-6 LCS								
Total Suspended Solids			95.6		%		85-115	01-OCT-18
WG2892307-5 MB								
Total Suspended Solids			<1.0		mg/L		1	01-OCT-18
TURBIDITY-VA	**Water**							
Batch R4249691								
WG2889467-2 CRM		**VA-FORM-40**						
Turbidity			102.8		%		85-115	28-SEP-18
WG2889467-1 MB								
Turbidity			<0.10		NTU		0.1	28-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	25-SEP-18 12:00	04-OCT-18 08:00	0.25	212	hours	EHTR-FM
pH by Meter (Automated)							
	1	25-SEP-18 12:00	03-OCT-18 08:04	0.25	188	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2171832 were received on 27-SEP-18 10:25.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 01-07_2018-09-25 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Can Dang			Email 1:	cait.good@teck.com	X	X	X
Email	cait.good@teck.com			Email	can.dang@alsglobal.com			Email 2:	caria.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	8081 Lougheed Hwy			Email 3:	colleen.mooney@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-425-8202			Phone Number	604-253-4188			PO number	VPO00554397			

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	F	N	F	N	F	N	N					
								PRESERV.	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3					
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-01-07_WP_Q3-2018_NP	RG_DW-01-07	WP	no	25-Sep-18	1200	G	#NAME?		1	1	1	1	1	1	1					

L2171832-COFC

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
		1809251630	RK,	27 Sep 18, 10:25am
				2°C

SERVICE REQUEST (rush - subject to availability)					
Regular (default) X	Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Priority (2-3 business days) - 50% surcharge				
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	September 25, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS				

Custody seal intact

Teck Coal Ltd.
ATTN: Allie Ferguson
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 28-NOV-18
Report Date: 04-DEC-18 18:55 (MT)
Version: FINAL

Client Phone: 250-425-8048

Certificate of Analysis

Lab Work Order #: L2202816

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 03-01_2018-11-27
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202816-1				
	Description	WP				
	Sampled Date	27-NOV-18				
	Sampled Time	13:35				
	Client ID	RG_DW-03-01_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	794				
	Hardness (as CaCO3) (mg/L)	442				
	pH (pH)	7.96				
	ORP (mV)	370				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	488 DLHC				
	Turbidity (NTU)	1.13				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	12.6				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	346				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	346				
	Ammonia as N (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	0.162				
	Chloride (Cl) (mg/L)	38.6				
	Fluoride (F) (mg/L)	0.181				
	Ion Balance (%)	103				
	Nitrate (as N) (mg/L)	0.104				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.052				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0014				
	Phosphorus (P)-Total (mg/L)	0.0051				
	Sulfate (SO4) (mg/L)	59.9				
	Anion Sum (meq/L)	9.27				
	Cation Sum (meq/L)	9.55				
	Cation - Anion Balance (%)	1.5				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.02				
	Total Organic Carbon (mg/L)	1.08				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	<0.00010				
	Barium (Ba)-Total (mg/L)	0.118				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.040				
	Cadmium (Cd)-Total (ug/L)	0.0724				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202816-1				
	Description	WP				
	Sampled Date	27-NOV-18				
	Sampled Time	13:35				
	Client ID	RG_DW-03-01_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	112				
	Chromium (Cr)-Total (mg/L)	0.00013				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	0.101				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	0.0193				
	Magnesium (Mg)-Total (mg/L)	35.6				
	Manganese (Mn)-Total (mg/L)	0.145				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00295				
	Nickel (Ni)-Total (mg/L)	0.00257				
	Potassium (K)-Total (mg/L)	2.02				
	Selenium (Se)-Total (ug/L)	0.177				
	Silicon (Si)-Total (mg/L)	4.94				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	14.5				
	Strontium (Sr)-Total (mg/L)	0.420				
	Thallium (Tl)-Total (mg/L)	0.000111				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00104				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	LAB				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.126				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.034				
	Cadmium (Cd)-Dissolved (ug/L)	0.0740				
	Calcium (Ca)-Dissolved (mg/L)	118				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202816-1				
	Description	WP				
	Sampled Date	27-NOV-18				
	Sampled Time	13:35				
	Client ID	RG_DW-03-01_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	<0.00050				
	Iron (Fe)-Dissolved (mg/L)	0.049				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0204				
	Magnesium (Mg)-Dissolved (mg/L)	35.7				
	Manganese (Mn)-Dissolved (mg/L)	0.137				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00301				
	Nickel (Ni)-Dissolved (mg/L)	0.00255				
	Potassium (K)-Dissolved (mg/L)	2.12				
	Selenium (Se)-Dissolved (ug/L)	0.196				
	Silicon (Si)-Dissolved (mg/L)	4.69				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	15.3				
	Strontium (Sr)-Dissolved (mg/L)	0.442				
	Thallium (Tl)-Dissolved (mg/L)	0.000100				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.000976				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0011				

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2202816-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2202816-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2202816-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2202816-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2202816-1
Matrix Spike	Aluminum (Al)-Total	MS-B	L2202816-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2202816-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2202816-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2202816-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2202816-1
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2202816-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2202816-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2202816-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by

Reference Information

subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

Reference Information

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

03-01_2018-11-27

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Allie Ferguson

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4365784								
WG2942518-2 LCS								
Acidity (as CaCO3)			102.8		%		85-115	29-NOV-18
WG2942518-1 MB								
Acidity (as CaCO3)			1.1		mg/L		2	29-NOV-18
ALK-MAN-CL	**Water**							
Batch R4365432								
WG2942251-11 LCS								
Alkalinity, Total (as CaCO3)			101.5		%		85-115	28-NOV-18
WG2942251-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	28-NOV-18
BE-D-L-CCMS-VA	**Water**							
Batch R4368855								
WG2943842-3 DUP		**L2202816-1**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	01-DEC-18
WG2943842-2 LCS								
Beryllium (Be)-Dissolved			96.9		%		80-120	01-DEC-18
WG2943842-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	01-DEC-18
BE-T-L-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-2 LCS								
Beryllium (Be)-Total			95.9		%		80-120	02-DEC-18
WG2943531-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	02-DEC-18
BR-L-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-6 LCS								
Bromide (Br)			105.6		%		85-115	28-NOV-18
WG2942588-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	28-NOV-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4366987								
WG2944090-2 LCS								
Dissolved Organic Carbon			97.7		%		80-120	30-NOV-18
WG2944090-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	30-NOV-18
C-TOT-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4366987								
WG2944090-2 LCS								
Total Organic Carbon			98.6		%		80-120	30-NOV-18
WG2944090-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-NOV-18
CL-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-6 LCS								
Chloride (Cl)			102.6		%		90-110	28-NOV-18
WG2942588-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	28-NOV-18
EC-L-PCT-CL	**Water**							
Batch R4365432								
WG2942251-11 LCS								
Conductivity (@ 25C)			98.6		%		90-110	28-NOV-18
WG2942251-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	28-NOV-18
F-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-6 LCS								
Fluoride (F)			105.2		%		90-110	28-NOV-18
WG2942588-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	28-NOV-18
HG-D-CVAA-VA	**Water**							
Batch R4369693								
WG2943609-2 LCS								
Mercury (Hg)-Dissolved			98.4		%		80-120	03-DEC-18
WG2943609-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	03-DEC-18
HG-T-CVAA-VA	**Water**							
Batch R4370789								
WG2945493-9 DUP		**L2202816-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	04-DEC-18
WG2945493-2 LCS								
Mercury (Hg)-Total			98.6		%		80-120	04-DEC-18
WG2945493-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	04-DEC-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4368855								
WG2943842-3 DUP		**L2202816-1**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	01-DEC-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	01-DEC-18
Arsenic (As)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	01-DEC-18
Barium (Ba)-Dissolved		0.126	0.126		mg/L	0.3	20	01-DEC-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	01-DEC-18
Boron (B)-Dissolved		0.034	0.034		mg/L	1.1	20	01-DEC-18
Cadmium (Cd)-Dissolved		0.0000740	0.0000839		mg/L	12	20	01-DEC-18
Calcium (Ca)-Dissolved		118	118		mg/L	0.2	20	01-DEC-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	01-DEC-18
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	01-DEC-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	01-DEC-18
Iron (Fe)-Dissolved		0.049	0.052		mg/L	4.7	20	01-DEC-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	01-DEC-18
Lithium (Li)-Dissolved		0.0204	0.0206		mg/L	1.2	20	01-DEC-18
Magnesium (Mg)-Dissolved		35.7	36.8		mg/L	3.0	20	01-DEC-18
Manganese (Mn)-Dissolved		0.137	0.140		mg/L	2.3	20	01-DEC-18
Molybdenum (Mo)-Dissolved		0.00301	0.00305		mg/L	1.5	20	01-DEC-18
Nickel (Ni)-Dissolved		0.00255	0.00259		mg/L	1.7	20	01-DEC-18
Potassium (K)-Dissolved		2.12	2.20		mg/L	3.8	20	01-DEC-18
Selenium (Se)-Dissolved		0.000196	0.000179		mg/L	9.2	20	01-DEC-18
Silicon (Si)-Dissolved		4.69	4.73		mg/L	1.0	20	01-DEC-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	01-DEC-18
Sodium (Na)-Dissolved		15.3	16.3		mg/L	6.7	20	01-DEC-18
Strontium (Sr)-Dissolved		0.442	0.456		mg/L	3.1	20	01-DEC-18
Thallium (Tl)-Dissolved		0.000100	0.000101		mg/L	0.6	20	01-DEC-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	01-DEC-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	01-DEC-18
Uranium (U)-Dissolved		0.000976	0.000966		mg/L	0.9	20	01-DEC-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	01-DEC-18
Zinc (Zn)-Dissolved		0.0011	0.0011		mg/L	1.6	20	01-DEC-18
WG2943842-2 LCS								
Aluminum (Al)-Dissolved			102.5		%		80-120	01-DEC-18
Antimony (Sb)-Dissolved			95.2		%		80-120	01-DEC-18
Arsenic (As)-Dissolved			101.1		%		80-120	01-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4368855								
WG2943842-2 LCS								
Barium (Ba)-Dissolved			101.5		%		80-120	01-DEC-18
Bismuth (Bi)-Dissolved			102.1		%		80-120	01-DEC-18
Boron (B)-Dissolved			93.0		%		80-120	01-DEC-18
Cadmium (Cd)-Dissolved			103.8		%		80-120	01-DEC-18
Calcium (Ca)-Dissolved			97.0		%		80-120	01-DEC-18
Chromium (Cr)-Dissolved			100.3		%		80-120	01-DEC-18
Cobalt (Co)-Dissolved			102.0		%		80-120	01-DEC-18
Copper (Cu)-Dissolved			100.4		%		80-120	01-DEC-18
Iron (Fe)-Dissolved			90.3		%		80-120	01-DEC-18
Lead (Pb)-Dissolved			102.5		%		80-120	01-DEC-18
Lithium (Li)-Dissolved			94.4		%		80-120	01-DEC-18
Magnesium (Mg)-Dissolved			102.2		%		80-120	01-DEC-18
Manganese (Mn)-Dissolved			101.3		%		80-120	01-DEC-18
Molybdenum (Mo)-Dissolved			94.5		%		80-120	01-DEC-18
Nickel (Ni)-Dissolved			104.3		%		80-120	01-DEC-18
Potassium (K)-Dissolved			102.9		%		80-120	01-DEC-18
Selenium (Se)-Dissolved			104.2		%		80-120	01-DEC-18
Silicon (Si)-Dissolved			104.5		%		60-140	01-DEC-18
Silver (Ag)-Dissolved			90.7		%		80-120	01-DEC-18
Sodium (Na)-Dissolved			107.2		%		80-120	01-DEC-18
Strontium (Sr)-Dissolved			94.4		%		80-120	01-DEC-18
Thallium (Tl)-Dissolved			101.5		%		80-120	01-DEC-18
Tin (Sn)-Dissolved			95.2		%		80-120	01-DEC-18
Titanium (Ti)-Dissolved			93.8		%		80-120	01-DEC-18
Uranium (U)-Dissolved			99.9		%		80-120	01-DEC-18
Vanadium (V)-Dissolved			105.2		%		80-120	01-DEC-18
Zinc (Zn)-Dissolved			106.4		%		80-120	01-DEC-18
WG2943842-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	01-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4368855								
WG2943842-1 MB		**LF**						
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	01-DEC-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	01-DEC-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	01-DEC-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	01-DEC-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	01-DEC-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	01-DEC-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	01-DEC-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	01-DEC-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
MET-T-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-2 LCS								
Aluminum (Al)-Total			99.4		%		80-120	02-DEC-18
Antimony (Sb)-Total			101.5		%		80-120	02-DEC-18
Arsenic (As)-Total			97.1		%		80-120	02-DEC-18
Barium (Ba)-Total			94.7		%		80-120	02-DEC-18
Bismuth (Bi)-Total			97.9		%		80-120	02-DEC-18
Boron (B)-Total			103.5		%		80-120	02-DEC-18
Cadmium (Cd)-Total			96.7		%		80-120	02-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-2 LCS								
Calcium (Ca)-Total			97.4		%		80-120	02-DEC-18
Chromium (Cr)-Total			98.5		%		80-120	02-DEC-18
Cobalt (Co)-Total			95.9		%		80-120	02-DEC-18
Copper (Cu)-Total			97.1		%		80-120	02-DEC-18
Iron (Fe)-Total			96.3		%		80-120	02-DEC-18
Lead (Pb)-Total			97.6		%		80-120	02-DEC-18
Lithium (Li)-Total			92.2		%		80-120	02-DEC-18
Magnesium (Mg)-Total			103.7		%		80-120	02-DEC-18
Manganese (Mn)-Total			100.1		%		80-120	02-DEC-18
Molybdenum (Mo)-Total			96.0		%		80-120	02-DEC-18
Nickel (Ni)-Total			95.7		%		80-120	02-DEC-18
Potassium (K)-Total			99.8		%		80-120	02-DEC-18
Selenium (Se)-Total			99.0		%		80-120	02-DEC-18
Silicon (Si)-Total			101.6		%		80-120	02-DEC-18
Silver (Ag)-Total			96.8		%		80-120	02-DEC-18
Sodium (Na)-Total			99.0		%		80-120	02-DEC-18
Strontium (Sr)-Total			98.4		%		80-120	02-DEC-18
Thallium (Tl)-Total			101.1		%		80-120	02-DEC-18
Tin (Sn)-Total			98.2		%		80-120	02-DEC-18
Titanium (Ti)-Total			96.7		%		80-120	02-DEC-18
Uranium (U)-Total			99.4		%		80-120	02-DEC-18
Vanadium (V)-Total			100.8		%		80-120	02-DEC-18
Zinc (Zn)-Total			98.2		%		80-120	02-DEC-18
WG2943531-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	02-DEC-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Boron (B)-Total			<0.010		mg/L		0.01	02-DEC-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	02-DEC-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	02-DEC-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	02-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-1 MB								
Copper (Cu)-Total			<0.00050		mg/L		0.0005	02-DEC-18
Iron (Fe)-Total			<0.010		mg/L		0.01	02-DEC-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	02-DEC-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	02-DEC-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	02-DEC-18
Potassium (K)-Total			<0.050		mg/L		0.05	02-DEC-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Silicon (Si)-Total			<0.10		mg/L		0.1	02-DEC-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	02-DEC-18
Sodium (Na)-Total			<0.050		mg/L		0.05	02-DEC-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	02-DEC-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	02-DEC-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	02-DEC-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	02-DEC-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	02-DEC-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	02-DEC-18
NH3-L-F-CL	**Water**							
Batch R4365123								
WG2941930-15 DUP		**L2202816-1**						
Ammonia as N		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	28-NOV-18
WG2941930-14 LCS								
Ammonia as N			85.7		%		85-115	28-NOV-18
WG2941930-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	28-NOV-18
WG2941930-16 MS		**L2202816-1**						
Ammonia as N			77.6		%		75-125	28-NOV-18
NO2-L-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-6 LCS								
Nitrite (as N)			108.2		%		90-110	28-NOV-18
WG2942588-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	28-NOV-18
NO3-L-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-6 LCS								
Nitrate (as N)			102.9		%		90-110	28-NOV-18
WG2942588-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	28-NOV-18
ORP-CL	**Water**							
Batch R4366431								
WG2943454-3 CRM		**CL-ORP**						
ORP			222		mV		210-230	29-NOV-18
P-T-L-COL-CL	**Water**							
Batch R4366828								
WG2943693-2 LCS								
Phosphorus (P)-Total			102.8		%		80-120	30-NOV-18
WG2943693-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	30-NOV-18
PH-CL	**Water**							
Batch R4365432								
WG2942251-11 LCS								
pH			6.96		pH		6.9-7.1	28-NOV-18
PO4-DO-L-COL-CL	**Water**							
Batch R4365089								
WG2941803-10 LCS								
Orthophosphate-Dissolved (as P)			102.6		%		80-120	28-NOV-18
WG2941803-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	28-NOV-18
SO4-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-6 LCS								
Sulfate (SO4)			102.0		%		90-110	28-NOV-18
WG2942588-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	28-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-CL	**Water**							
Batch R4366806								
WG2942359-5 LCS								
Total Dissolved Solids			98.1		%		85-115	29-NOV-18
WG2942359-4 MB								
Total Dissolved Solids			<10		mg/L		10	29-NOV-18
TKN-L-F-CL	**Water**							
Batch R4365926								
WG2941292-10 LCS								
Total Kjeldahl Nitrogen			88.9		%		75-125	29-NOV-18
WG2941292-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	29-NOV-18
TSS-L-CL	**Water**							
Batch R4367042								
WG2943603-2 LCS								
Total Suspended Solids			96.7		%		85-115	30-NOV-18
WG2943603-1 MB								
Total Suspended Solids			<1.0		mg/L		1	30-NOV-18
TURBIDITY-CL	**Water**							
Batch R4365117								
WG2941919-5 LCS								
Turbidity			95.5		%		85-115	28-NOV-18
WG2941919-4 MB								
Turbidity			<0.10		NTU		0.1	28-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	27-NOV-18 13:35	29-NOV-18 13:30	0.25	48	hours	EHTR-FM
pH							
	1	27-NOV-18 13:35	28-NOV-18 15:00	0.25	25	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2202816 were received on 28-NOV-18 09:35.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: 03-01_2018-11-27

TURNAROUND

RUSH:

L2202816-COFC

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program
Project Manager	Allie Ferguson
Email	allie.ferguson@teck.com
Address	421 Pine Avenue
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-425-8202

LAB INFO

Lab Name	Al
Lab Contact	Ly
Email	lyudmyla.shvets@alsglobal.com
Address	2559 29 Street NE
City	Calgary
Province	Ab
Postal Code	T1Y 7B5
Country	Canada
Phone Number	1 403 407 1794

OTHER INFO

		Excel	PDF	EDD
ribution	allie.ferguson@teck.com	X	X	X
Email 2:	cait.good@teck.com	X	X	X
Email 3:	carlie.meyer@teck.com	X	X	X
Email 4:	teckcoal@equisonline.com			X
Email 5:				
PO number	VPO00554397			

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA
								F	N	F	N	F	N	N
PRESERV								H2SO4	H2SO4	HCL	HCL	HNO3	HNO3	
RG_DW-03-01_WP_Q4-2018_NP	RG_DW-03-01	WP	no	27-Nov-18	1335	G	7	1	1	1	1	1	1	1

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION

Ryan Schopman

DATE/TIME

18/11/27/1600

ACCEPTED BY/AFFILIATION

DATE/TIME

11/28

9:35

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Sampler's Signature		Date/Time	November 27, 2018

32

Teck Coal Ltd.
ATTN: Allie Ferguson
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 27-NOV-18
Report Date: 03-DEC-18 15:30 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2202156

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 01-03_2018-11-26
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202156-1				
	Description	WP				
	Sampled Date	26-NOV-18				
	Sampled Time	10:35				
	Client ID	RG_DW-01-03_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	343				
	Hardness (as CaCO3) (mg/L)	188				
	pH (pH)	8.28				
	ORP (mV)	371				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	169 DLHC				
	Turbidity (NTU)	0.35				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	1.4				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	156				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	156				
	Ammonia as N (mg/L)	0.0175				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	0.82				
	Fluoride (F) (mg/L)	0.155				
	Ion Balance (%)	97.6				
	Nitrate (as N) (mg/L)	0.670				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.067 TKNI				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0010				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	35.4				
	Anion Sum (meq/L)	3.93				
	Cation Sum (meq/L)	3.83				
	Cation - Anion Balance (%)	-1.2				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50				
	Total Organic Carbon (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	<0.00010				
	Barium (Ba)-Total (mg/L)	0.0726				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (ug/L)	0.0090				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202156-1				
	Description	WP				
	Sampled Date	26-NOV-18				
	Sampled Time	10:35				
	Client ID	RG_DW-01-03_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	52.2				
	Chromium (Cr)-Total (mg/L)	0.00029				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.00092				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	0.000113				
	Lithium (Li)-Total (mg/L)	0.0025				
	Magnesium (Mg)-Total (mg/L)	13.6				
	Manganese (Mn)-Total (mg/L)	0.00011				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.000936				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Potassium (K)-Total (mg/L)	0.409				
	Selenium (Se)-Total (ug/L)	2.68				
	Silicon (Si)-Total (mg/L)	2.10				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	1.35				
	Strontium (Sr)-Total (mg/L)	0.189				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.000795				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0070				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.0716				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (ug/L)	0.0082				
	Calcium (Ca)-Dissolved (mg/L)	53.8				
	Chromium (Cr)-Dissolved (mg/L)	0.00024				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202156-1				
	Description	WP				
	Sampled Date	26-NOV-18				
	Sampled Time	10:35				
	Client ID	RG_DW-01-03_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	0.00075				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	0.000053				
	Lithium (Li)-Dissolved (mg/L)	0.0023				
	Magnesium (Mg)-Dissolved (mg/L)	13.1				
	Manganese (Mn)-Dissolved (mg/L)	<0.00010				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000940				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	0.410				
	Selenium (Se)-Dissolved (ug/L)	2.98				
	Silicon (Si)-Dissolved (mg/L)	1.95				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	1.32				
	Strontium (Sr)-Dissolved (mg/L)	0.209				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.000797				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0059				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2202156-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2202156-1
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L2202156-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2202156-1
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L2202156-1
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2202156-1
Matrix Spike	Selenium (Se)-Dissolved	MS-B	L2202156-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2202156-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2202156-1
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2202156-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2202156-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2202156-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2202156-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2202156-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

Reference Information

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

Reference Information

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

01-03_2018-11-26

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Allie Ferguson

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4364859								
WG2941635-2 LCS								
Acidity (as CaCO3)			107.7		%		85-115	28-NOV-18
WG2941635-1 MB								
Acidity (as CaCO3)			1.1		mg/L		2	28-NOV-18
ALK-MAN-CL	**Water**							
Batch R4365432								
WG2942251-2 LCS								
Alkalinity, Total (as CaCO3)			103.5		%		85-115	28-NOV-18
WG2942251-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	28-NOV-18
BE-D-L-CCMS-VA	**Water**							
Batch R4366260								
WG2942241-2 LCS								
Beryllium (Be)-Dissolved			98.2		%		80-120	29-NOV-18
WG2942241-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	29-NOV-18
BE-T-L-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-2 LCS								
Beryllium (Be)-Total			103.1		%		80-120	29-NOV-18
WG2942153-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	29-NOV-18
WG2942153-4 MS		**L2202156-1**						
Beryllium (Be)-Total			95.6		%		70-130	29-NOV-18
BR-L-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Bromide (Br)			103.8		%		85-115	27-NOV-18
WG2941508-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	27-NOV-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4365507								
WG2942497-6 LCS								
Dissolved Organic Carbon			100.5		%		80-120	28-NOV-18
WG2942497-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	28-NOV-18
C-TOT-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4365507								
WG2942497-6 LCS								
Total Organic Carbon			101.8		%		80-120	28-NOV-18
WG2942497-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	28-NOV-18
CL-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Chloride (Cl)			105.0		%		90-110	27-NOV-18
WG2941508-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	27-NOV-18
EC-L-PCT-CL	**Water**							
Batch R4365432								
WG2942251-2 LCS								
Conductivity (@ 25C)			99.2		%		90-110	28-NOV-18
WG2942251-1 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	28-NOV-18
F-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Fluoride (F)			108.2		%		90-110	27-NOV-18
WG2941508-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	27-NOV-18
HG-D-CVAA-VA	**Water**							
Batch R4366173								
WG2942332-2 LCS								
Mercury (Hg)-Dissolved			99.5		%		80-120	30-NOV-18
WG2942332-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	30-NOV-18
HG-T-CVAA-VA	**Water**							
Batch R4366993								
WG2944075-2 LCS								
Mercury (Hg)-Total			100.4		%		80-120	01-DEC-18
WG2944075-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	01-DEC-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4366260								
WG2942241-2 LCS								
Aluminum (Al)-Dissolved			98.3		%		80-120	29-NOV-18
Antimony (Sb)-Dissolved			97.0		%		80-120	29-NOV-18
Arsenic (As)-Dissolved			96.6		%		80-120	29-NOV-18
Barium (Ba)-Dissolved			101.0		%		80-120	29-NOV-18
Bismuth (Bi)-Dissolved			103.7		%		80-120	29-NOV-18
Boron (B)-Dissolved			94.7		%		80-120	29-NOV-18
Cadmium (Cd)-Dissolved			96.6		%		80-120	29-NOV-18
Calcium (Ca)-Dissolved			98.9		%		80-120	29-NOV-18
Chromium (Cr)-Dissolved			99.9		%		80-120	29-NOV-18
Cobalt (Co)-Dissolved			97.3		%		80-120	29-NOV-18
Copper (Cu)-Dissolved			99.2		%		80-120	29-NOV-18
Iron (Fe)-Dissolved			90.6		%		80-120	29-NOV-18
Lead (Pb)-Dissolved			94.5		%		80-120	29-NOV-18
Lithium (Li)-Dissolved			95.8		%		80-120	29-NOV-18
Magnesium (Mg)-Dissolved			108.1		%		80-120	29-NOV-18
Manganese (Mn)-Dissolved			96.9		%		80-120	29-NOV-18
Molybdenum (Mo)-Dissolved			103.5		%		80-120	29-NOV-18
Nickel (Ni)-Dissolved			95.4		%		80-120	29-NOV-18
Potassium (K)-Dissolved			97.4		%		80-120	29-NOV-18
Selenium (Se)-Dissolved			94.5		%		80-120	29-NOV-18
Silicon (Si)-Dissolved			96.8		%		60-140	29-NOV-18
Silver (Ag)-Dissolved			92.1		%		80-120	29-NOV-18
Sodium (Na)-Dissolved			102.7		%		80-120	29-NOV-18
Strontium (Sr)-Dissolved			100.2		%		80-120	29-NOV-18
Thallium (Tl)-Dissolved			93.1		%		80-120	29-NOV-18
Tin (Sn)-Dissolved			96.6		%		80-120	29-NOV-18
Titanium (Ti)-Dissolved			97.3		%		80-120	29-NOV-18
Uranium (U)-Dissolved			100.5		%		80-120	29-NOV-18
Vanadium (V)-Dissolved			99.2		%		80-120	29-NOV-18
Zinc (Zn)-Dissolved			99.0		%		80-120	29-NOV-18
WG2942241-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	29-NOV-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4366260								
WG2942241-1 MB		**NP**						
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	29-NOV-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	29-NOV-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	29-NOV-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	29-NOV-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	29-NOV-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	29-NOV-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	29-NOV-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	29-NOV-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	29-NOV-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	29-NOV-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	29-NOV-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	29-NOV-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	29-NOV-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	29-NOV-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	29-NOV-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	29-NOV-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	29-NOV-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	29-NOV-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	29-NOV-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	29-NOV-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	29-NOV-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	29-NOV-18
MET-T-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-2 LCS								
Aluminum (Al)-Total			102.9		%		80-120	29-NOV-18
Antimony (Sb)-Total			103.2		%		80-120	29-NOV-18
Arsenic (As)-Total			105.6		%		80-120	29-NOV-18
Barium (Ba)-Total			110.2		%		80-120	29-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-2 LCS								
Bismuth (Bi)-Total			100.3		%		80-120	29-NOV-18
Boron (B)-Total			100.3		%		80-120	29-NOV-18
Cadmium (Cd)-Total			103.2		%		80-120	29-NOV-18
Calcium (Ca)-Total			103.0		%		80-120	29-NOV-18
Chromium (Cr)-Total			104.3		%		80-120	29-NOV-18
Cobalt (Co)-Total			105.3		%		80-120	29-NOV-18
Copper (Cu)-Total			105.2		%		80-120	29-NOV-18
Iron (Fe)-Total			104.2		%		80-120	29-NOV-18
Lead (Pb)-Total			101.3		%		80-120	29-NOV-18
Lithium (Li)-Total			103.6		%		80-120	29-NOV-18
Magnesium (Mg)-Total			111.0		%		80-120	29-NOV-18
Manganese (Mn)-Total			106.9		%		80-120	29-NOV-18
Molybdenum (Mo)-Total			100.0		%		80-120	29-NOV-18
Nickel (Ni)-Total			104.7		%		80-120	29-NOV-18
Potassium (K)-Total			109.7		%		80-120	29-NOV-18
Selenium (Se)-Total			98.9		%		80-120	29-NOV-18
Silicon (Si)-Total			106.8		%		80-120	29-NOV-18
Silver (Ag)-Total			96.7		%		80-120	29-NOV-18
Sodium (Na)-Total			111.9		%		80-120	29-NOV-18
Strontium (Sr)-Total			101.2		%		80-120	29-NOV-18
Thallium (Tl)-Total			102.9		%		80-120	29-NOV-18
Tin (Sn)-Total			98.6		%		80-120	29-NOV-18
Titanium (Ti)-Total			108.7		%		80-120	29-NOV-18
Uranium (U)-Total			102.2		%		80-120	29-NOV-18
Vanadium (V)-Total			103.6		%		80-120	29-NOV-18
Zinc (Zn)-Total			104.3		%		80-120	29-NOV-18
WG2942153-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	29-NOV-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Boron (B)-Total			<0.010		mg/L		0.01	29-NOV-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	29-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	29-NOV-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	29-NOV-18
Iron (Fe)-Total			<0.010		mg/L		0.01	29-NOV-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	29-NOV-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	29-NOV-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	29-NOV-18
Potassium (K)-Total			<0.050		mg/L		0.05	29-NOV-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Silicon (Si)-Total			<0.10		mg/L		0.1	29-NOV-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	29-NOV-18
Sodium (Na)-Total			<0.050		mg/L		0.05	29-NOV-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	29-NOV-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	29-NOV-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	29-NOV-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	29-NOV-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	29-NOV-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	29-NOV-18
WG2942153-4 MS		**L2202156-1**						
Aluminum (Al)-Total			96.1		%		70-130	29-NOV-18
Antimony (Sb)-Total			94.0		%		70-130	29-NOV-18
Arsenic (As)-Total			101.6		%		70-130	29-NOV-18
Barium (Ba)-Total			N/A	MS-B	%		-	29-NOV-18
Bismuth (Bi)-Total			93.2		%		70-130	29-NOV-18
Boron (B)-Total			96.7		%		70-130	29-NOV-18
Cadmium (Cd)-Total			98.3		%		70-130	29-NOV-18
Calcium (Ca)-Total			N/A	MS-B	%		-	29-NOV-18
Chromium (Cr)-Total			97.2		%		70-130	29-NOV-18
Cobalt (Co)-Total			95.8		%		70-130	29-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-4 MS		**L2202156-1**						
Copper (Cu)-Total			97.7		%		70-130	29-NOV-18
Iron (Fe)-Total			91.5		%		70-130	29-NOV-18
Lead (Pb)-Total			92.3		%		70-130	29-NOV-18
Lithium (Li)-Total			89.6		%		70-130	29-NOV-18
Magnesium (Mg)-Total			N/A	MS-B	%		-	29-NOV-18
Manganese (Mn)-Total			98.8		%		70-130	29-NOV-18
Molybdenum (Mo)-Total			90.4		%		70-130	29-NOV-18
Nickel (Ni)-Total			96.3		%		70-130	29-NOV-18
Potassium (K)-Total			98.8		%		70-130	29-NOV-18
Selenium (Se)-Total			92.1		%		70-130	29-NOV-18
Silicon (Si)-Total			91.3		%		70-130	29-NOV-18
Silver (Ag)-Total			92.9		%		70-130	29-NOV-18
Sodium (Na)-Total			98.0		%		70-130	29-NOV-18
Strontium (Sr)-Total			N/A	MS-B	%		-	29-NOV-18
Thallium (Tl)-Total			93.8		%		70-130	29-NOV-18
Tin (Sn)-Total			91.1		%		70-130	29-NOV-18
Titanium (Ti)-Total			101.2		%		70-130	29-NOV-18
Uranium (U)-Total			96.2		%		70-130	29-NOV-18
Vanadium (V)-Total			98.5		%		70-130	29-NOV-18
Zinc (Zn)-Total			93.5		%		70-130	29-NOV-18
NH3-L-F-CL	**Water**							
Batch R4365123								
WG2941930-2 LCS								
Ammonia as N			85.4		%		85-115	28-NOV-18
WG2941930-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	28-NOV-18
NO2-L-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Nitrite (as N)			109.5		%		90-110	27-NOV-18
WG2941508-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	27-NOV-18
NO3-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Nitrate (as N)			104.4		%		90-110	27-NOV-18
WG2941508-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	27-NOV-18
ORP-CL	**Water**							
Batch R4364328								
WG2941426-1 CRM		**CL-ORP**						
ORP			221		mV		210-230	27-NOV-18
P-T-L-COL-CL	**Water**							
Batch R4365840								
WG2942469-10 LCS								
Phosphorus (P)-Total			116.9		%		80-120	29-NOV-18
WG2942469-9 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	28-NOV-18
PH-CL	**Water**							
Batch R4365432								
WG2942251-2 LCS								
pH			7.00		pH		6.9-7.1	28-NOV-18
PO4-DO-L-COL-CL	**Water**							
Batch R4363008								
WG2940833-2 LCS								
Orthophosphate-Dissolved (as P)			101.2		%		80-120	27-NOV-18
WG2940833-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	27-NOV-18
SO4-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Sulfate (SO4)			103.4		%		90-110	27-NOV-18
WG2941508-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	27-NOV-18
SOLIDS-TDS-CL	**Water**							
Batch R4365552								
WG2941263-2 LCS								
Total Dissolved Solids			94.3		%		85-115	28-NOV-18
WG2941263-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-CL	**Water**							
Batch R4365552								
WG2941263-1 MB								
Total Dissolved Solids			<10		mg/L		10	28-NOV-18
TKN-L-F-CL	**Water**							
Batch R4365013								
WG2940796-2 LCS								
Total Kjeldahl Nitrogen			95.4		%		75-125	28-NOV-18
WG2940796-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	28-NOV-18
TSS-L-CL	**Water**							
Batch R4365595								
WG2941214-4 LCS								
Total Suspended Solids			86.7		%		85-115	28-NOV-18
WG2941214-3 MB								
Total Suspended Solids			<1.0		mg/L		1	28-NOV-18
TURBIDITY-CL	**Water**							
Batch R4362828								
WG2940759-5 LCS								
Turbidity			95.0		%		85-115	27-NOV-18
WG2940759-4 MB								
Turbidity			<0.10		NTU		0.1	27-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	26-NOV-18 10:35	27-NOV-18 15:20	0.25	29	hours	EHTR-FM
pH							
	1	26-NOV-18 10:35	28-NOV-18 15:00	0.25	52	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2202156 were received on 27-NOV-18 09:20.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2202156-COFC

COC ID:	01-03_2018-11-26	TURNAROUND TI		USH:

PROJECT/CLIENT INFO				LA				OTHER INFO			
Facility Name / Job#	Regional Effects Program			Lab Name	ALS			...ution	Excel	PDF	EDD
Project Manager	Allie Ferguson			Lab Contact	Lyudmyla Shvets			Email 1: allie.ferguson@teck.com	X	X	X
Email	allie.ferguson@teck.com			Email	lyudmyla.shvets@alsglobal.com			Email 2: cait.good@teck.com	X	X	X
Address	421 Pine Ave			Address	2559 29 Street NE			Email 3: carlie.meyer@teck.com	X	X	X
								Email 4: teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada				
Phone Number	250.425.8048			Phone Number	1 403 407 1794			PO number			

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA
FILTERED								F	N	F	N	F	N	N
PRESERVATIVE								H2SO4	H2SO4	HCL	HCL	HNO3	HNO3	
RG_DW-01-03_WP_Q4-2018_NP	RG_DW-01-03	WP	N	26-Nov-18	1035	G	7	1	1	1	1	1	1	1

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Ryan Schopman	18/11/26/1600	[signature]	11/27 4:20

SERVICE REQUEST (rush - subject to availability)	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Sampler's Signature	[signature]	Date/Time	November 29, 2018

5°C

Teck Coal Ltd.
ATTN: Allie Ferguson
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 27-NOV-18
Report Date: 03-DEC-18 15:34 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2202182

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 01-07_2018-11-26
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202182-1				
	Description	WP				
	Sampled Date	26-NOV-18				
	Sampled Time	11:30				
	Client ID	RG_DW-01-07_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	746				
	Hardness (as CaCO3) (mg/L)	450				
	pH (pH)	8.00				
	ORP (mV)	383				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	410 DLHC				
	Turbidity (NTU)	1.08				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	22.9				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	386				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	386				
	Ammonia as N (mg/L)	0.0143				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	3.85				
	Fluoride (F) (mg/L)	0.093				
	Ion Balance (%)	99.5				
	Nitrate (as N) (mg/L)	0.733				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.105				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0022				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	67.4				
	Anion Sum (meq/L)	9.28				
	Cation Sum (meq/L)	9.24				
	Cation - Anion Balance (%)	-0.2				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.00				
	Total Organic Carbon (mg/L)	0.93				
Total Metals	Aluminum (Al)-Total (mg/L)	0.0062				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00012				
	Barium (Ba)-Total (mg/L)	0.116				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.019				
	Cadmium (Cd)-Total (ug/L)	0.0525				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202182-1				
	Description	WP				
	Sampled Date	26-NOV-18				
	Sampled Time	11:30				
	Client ID	RG_DW-01-07_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	106				
	Chromium (Cr)-Total (mg/L)	0.00035				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.0173				
	Iron (Fe)-Total (mg/L)	0.086				
	Lead (Pb)-Total (mg/L)	0.00176				
	Lithium (Li)-Total (mg/L)	0.0068				
	Magnesium (Mg)-Total (mg/L)	39.2				
	Manganese (Mn)-Total (mg/L)	0.00076				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00368				
	Nickel (Ni)-Total (mg/L)	0.00134				
	Potassium (K)-Total (mg/L)	0.916				
	Selenium (Se)-Total (ug/L)	1.69				
	Silicon (Si)-Total (mg/L)	6.37				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	5.30				
	Strontium (Sr)-Total (mg/L)	0.260				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	0.00024				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00166				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0426				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.117				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.020				
	Cadmium (Cd)-Dissolved (ug/L)	0.0421				
	Calcium (Ca)-Dissolved (mg/L)	115				
	Chromium (Cr)-Dissolved (mg/L)	0.00019				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202182-1				
	Description	WP				
	Sampled Date	26-NOV-18				
	Sampled Time	11:30				
	Client ID	RG_DW-01-07_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	0.00604				
	Iron (Fe)-Dissolved (mg/L)	0.015				
	Lead (Pb)-Dissolved (mg/L)	0.00103				
	Lithium (Li)-Dissolved (mg/L)	0.0067				
	Magnesium (Mg)-Dissolved (mg/L)	39.4				
	Manganese (Mn)-Dissolved (mg/L)	0.00035				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00384				
	Nickel (Ni)-Dissolved (mg/L)	0.00072				
	Potassium (K)-Dissolved (mg/L)	0.903				
	Selenium (Se)-Dissolved (ug/L)	2.09				
	Silicon (Si)-Dissolved (mg/L)	6.18				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	5.10				
	Strontium (Sr)-Dissolved (mg/L)	0.297				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00168				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0289				

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2202182-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2202182-1
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L2202182-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2202182-1
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L2202182-1
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2202182-1
Matrix Spike	Selenium (Se)-Dissolved	MS-B	L2202182-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2202182-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2202182-1
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2202182-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2202182-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2202182-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2202182-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2202182-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

Reference Information

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

Reference Information

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

01-07_2018-11-26

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Allie Ferguson

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4364859								
WG2941635-2 LCS								
Acidity (as CaCO3)			107.7		%		85-115	28-NOV-18
WG2941635-1 MB								
Acidity (as CaCO3)			1.1		mg/L		2	28-NOV-18
ALK-MAN-CL	**Water**							
Batch R4365432								
WG2942251-2 LCS								
Alkalinity, Total (as CaCO3)			103.5		%		85-115	28-NOV-18
WG2942251-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	28-NOV-18
BE-D-L-CCMS-VA	**Water**							
Batch R4366260								
WG2942241-2 LCS								
Beryllium (Be)-Dissolved			98.2		%		80-120	29-NOV-18
WG2942241-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	29-NOV-18
BE-T-L-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-2 LCS								
Beryllium (Be)-Total			103.1		%		80-120	29-NOV-18
WG2942153-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	29-NOV-18
BR-L-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-7 DUP		**L2202182-1**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	27-NOV-18
WG2941508-6 LCS								
Bromide (Br)			103.8		%		85-115	27-NOV-18
WG2941508-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	27-NOV-18
WG2941508-8 MS		**L2202182-1**						
Bromide (Br)			106.3		%		75-125	27-NOV-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4365507								
WG2942497-6 LCS								
Dissolved Organic Carbon			100.5		%		80-120	28-NOV-18
WG2942497-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R4365507								
WG2942497-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	28-NOV-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4365507								
WG2942497-6 LCS								
Total Organic Carbon			101.8		%		80-120	28-NOV-18
WG2942497-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	28-NOV-18
CL-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-7 DUP		**L2202182-1**						
Chloride (Cl)		3.85	3.80		mg/L	1.3	20	27-NOV-18
WG2941508-6 LCS								
Chloride (Cl)			105.0		%		90-110	27-NOV-18
WG2941508-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	27-NOV-18
WG2941508-8 MS		**L2202182-1**						
Chloride (Cl)			106.9		%		75-125	27-NOV-18
EC-L-PCT-CL	**Water**							
Batch R4365432								
WG2942251-2 LCS								
Conductivity (@ 25C)			99.2		%		90-110	28-NOV-18
WG2942251-1 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	28-NOV-18
F-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-7 DUP		**L2202182-1**						
Fluoride (F)		0.093	0.090		mg/L	3.2	20	27-NOV-18
WG2941508-6 LCS								
Fluoride (F)			108.2		%		90-110	27-NOV-18
WG2941508-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	27-NOV-18
WG2941508-8 MS		**L2202182-1**						
Fluoride (F)			103.9		%		75-125	27-NOV-18
HG-D-CVAA-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R4366173								
WG2942332-6 LCS								
Mercury (Hg)-Dissolved			98.7		%		80-120	30-NOV-18
WG2942332-5 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005		mg/L		0.000005	30-NOV-18
HG-T-CVAA-VA	**Water**							
Batch R4366993								
WG2944075-2 LCS								
Mercury (Hg)-Total			100.4		%		80-120	01-DEC-18
WG2944075-1 MB								
Mercury (Hg)-Total			<0.000005		mg/L		0.000005	01-DEC-18
MET-D-CCMS-VA	**Water**							
Batch R4366260								
WG2942241-2 LCS								
Aluminum (Al)-Dissolved			98.3		%		80-120	29-NOV-18
Antimony (Sb)-Dissolved			97.0		%		80-120	29-NOV-18
Arsenic (As)-Dissolved			96.6		%		80-120	29-NOV-18
Barium (Ba)-Dissolved			101.0		%		80-120	29-NOV-18
Bismuth (Bi)-Dissolved			103.7		%		80-120	29-NOV-18
Boron (B)-Dissolved			94.7		%		80-120	29-NOV-18
Cadmium (Cd)-Dissolved			96.6		%		80-120	29-NOV-18
Calcium (Ca)-Dissolved			98.9		%		80-120	29-NOV-18
Chromium (Cr)-Dissolved			99.9		%		80-120	29-NOV-18
Cobalt (Co)-Dissolved			97.3		%		80-120	29-NOV-18
Copper (Cu)-Dissolved			99.2		%		80-120	29-NOV-18
Iron (Fe)-Dissolved			90.6		%		80-120	29-NOV-18
Lead (Pb)-Dissolved			94.5		%		80-120	29-NOV-18
Lithium (Li)-Dissolved			95.8		%		80-120	29-NOV-18
Magnesium (Mg)-Dissolved			108.1		%		80-120	29-NOV-18
Manganese (Mn)-Dissolved			96.9		%		80-120	29-NOV-18
Molybdenum (Mo)-Dissolved			103.5		%		80-120	29-NOV-18
Nickel (Ni)-Dissolved			95.4		%		80-120	29-NOV-18
Potassium (K)-Dissolved			97.4		%		80-120	29-NOV-18
Selenium (Se)-Dissolved			94.5		%		80-120	29-NOV-18
Silicon (Si)-Dissolved			96.8		%		60-140	29-NOV-18
Silver (Ag)-Dissolved			92.1		%		80-120	29-NOV-18
Sodium (Na)-Dissolved			102.7		%		80-120	29-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4366260								
WG2942241-2 LCS								
Strontium (Sr)-Dissolved			100.2		%		80-120	29-NOV-18
Thallium (Tl)-Dissolved			93.1		%		80-120	29-NOV-18
Tin (Sn)-Dissolved			96.6		%		80-120	29-NOV-18
Titanium (Ti)-Dissolved			97.3		%		80-120	29-NOV-18
Uranium (U)-Dissolved			100.5		%		80-120	29-NOV-18
Vanadium (V)-Dissolved			99.2		%		80-120	29-NOV-18
Zinc (Zn)-Dissolved			99.0		%		80-120	29-NOV-18
WG2942241-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	29-NOV-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	29-NOV-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	29-NOV-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	29-NOV-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	29-NOV-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	29-NOV-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	29-NOV-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	29-NOV-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	29-NOV-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	29-NOV-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	29-NOV-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	29-NOV-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	29-NOV-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	29-NOV-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	29-NOV-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	29-NOV-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	29-NOV-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	29-NOV-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	29-NOV-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	29-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4366260								
WG2942241-1 MB		**NP**						
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	29-NOV-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	29-NOV-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	29-NOV-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	29-NOV-18
MET-T-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-2 LCS								
Aluminum (Al)-Total			102.9		%		80-120	29-NOV-18
Antimony (Sb)-Total			103.2		%		80-120	29-NOV-18
Arsenic (As)-Total			105.6		%		80-120	29-NOV-18
Barium (Ba)-Total			110.2		%		80-120	29-NOV-18
Bismuth (Bi)-Total			100.3		%		80-120	29-NOV-18
Boron (B)-Total			100.3		%		80-120	29-NOV-18
Cadmium (Cd)-Total			103.2		%		80-120	29-NOV-18
Calcium (Ca)-Total			103.0		%		80-120	29-NOV-18
Chromium (Cr)-Total			104.3		%		80-120	29-NOV-18
Cobalt (Co)-Total			105.3		%		80-120	29-NOV-18
Copper (Cu)-Total			105.2		%		80-120	29-NOV-18
Iron (Fe)-Total			104.2		%		80-120	29-NOV-18
Lead (Pb)-Total			101.3		%		80-120	29-NOV-18
Lithium (Li)-Total			103.6		%		80-120	29-NOV-18
Magnesium (Mg)-Total			111.0		%		80-120	29-NOV-18
Manganese (Mn)-Total			106.9		%		80-120	29-NOV-18
Molybdenum (Mo)-Total			100.0		%		80-120	29-NOV-18
Nickel (Ni)-Total			104.7		%		80-120	29-NOV-18
Potassium (K)-Total			109.7		%		80-120	29-NOV-18
Selenium (Se)-Total			98.9		%		80-120	29-NOV-18
Silicon (Si)-Total			106.8		%		80-120	29-NOV-18
Silver (Ag)-Total			96.7		%		80-120	29-NOV-18
Sodium (Na)-Total			111.9		%		80-120	29-NOV-18
Strontium (Sr)-Total			101.2		%		80-120	29-NOV-18
Thallium (Tl)-Total			102.9		%		80-120	29-NOV-18
Tin (Sn)-Total			98.6		%		80-120	29-NOV-18
Titanium (Ti)-Total			108.7		%		80-120	29-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-2 LCS								
Uranium (U)-Total			102.2		%		80-120	29-NOV-18
Vanadium (V)-Total			103.6		%		80-120	29-NOV-18
Zinc (Zn)-Total			104.3		%		80-120	29-NOV-18
WG2942153-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	29-NOV-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Boron (B)-Total			<0.010		mg/L		0.01	29-NOV-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	29-NOV-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	29-NOV-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	29-NOV-18
Iron (Fe)-Total			<0.010		mg/L		0.01	29-NOV-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	29-NOV-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	29-NOV-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	29-NOV-18
Potassium (K)-Total			<0.050		mg/L		0.05	29-NOV-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Silicon (Si)-Total			<0.10		mg/L		0.1	29-NOV-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	29-NOV-18
Sodium (Na)-Total			<0.050		mg/L		0.05	29-NOV-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	29-NOV-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	29-NOV-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	29-NOV-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	29-NOV-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	29-NOV-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	29-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-L-F-CL	**Water**							
Batch R4365123								
WG2941930-2 LCS								
Ammonia as N			85.4		%		85-115	28-NOV-18
WG2941930-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	28-NOV-18
NO2-L-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-7 DUP		**L2202182-1**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	27-NOV-18
WG2941508-6 LCS								
Nitrite (as N)			109.5		%		90-110	27-NOV-18
WG2941508-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	27-NOV-18
WG2941508-8 MS		**L2202182-1**						
Nitrite (as N)			108.5		%		75-125	27-NOV-18
NO3-L-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-7 DUP		**L2202182-1**						
Nitrate (as N)		0.733	0.725		mg/L	1.1	20	27-NOV-18
WG2941508-6 LCS								
Nitrate (as N)			104.4		%		90-110	27-NOV-18
WG2941508-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	27-NOV-18
WG2941508-8 MS		**L2202182-1**						
Nitrate (as N)			106.2		%		75-125	27-NOV-18
ORP-CL	**Water**							
Batch R4364328								
WG2941426-1 CRM		**CL-ORP**						
ORP			221		mV		210-230	27-NOV-18
P-T-L-COL-CL	**Water**							
Batch R4365840								
WG2942469-14 LCS								
Phosphorus (P)-Total			114.1		%		80-120	29-NOV-18
WG2942469-13 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	28-NOV-18
PH-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-CL	**Water**							
Batch R4365432								
WG2942251-2 LCS								
pH			7.00		pH		6.9-7.1	28-NOV-18
PO4-DO-L-COL-CL	**Water**							
Batch R4363008								
WG2940833-2 LCS								
Orthophosphate-Dissolved (as P)			101.2		%		80-120	27-NOV-18
WG2940833-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	27-NOV-18
SO4-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-7 DUP		**L2202182-1**						
Sulfate (SO4)		67.4	67.0		mg/L	0.6	20	27-NOV-18
WG2941508-6 LCS								
Sulfate (SO4)			103.4		%		90-110	27-NOV-18
WG2941508-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	27-NOV-18
WG2941508-8 MS		**L2202182-1**						
Sulfate (SO4)			101.5		%		75-125	27-NOV-18
SOLIDS-TDS-CL	**Water**							
Batch R4365552								
WG2941263-2 LCS								
Total Dissolved Solids			94.3		%		85-115	28-NOV-18
WG2941263-1 MB								
Total Dissolved Solids			<10		mg/L		10	28-NOV-18
TKN-L-F-CL	**Water**							
Batch R4365013								
WG2940796-2 LCS								
Total Kjeldahl Nitrogen			95.4		%		75-125	28-NOV-18
WG2940796-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	28-NOV-18
TSS-L-CL	**Water**							
Batch R4365595								
WG2941214-4 LCS								
Total Suspended Solids			86.7		%		85-115	28-NOV-18
WG2941214-3 MB								
Total Suspended Solids			<1.0		mg/L		1	28-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-CL	**Water**							
Batch R4362828								
WG2940759-5 LCS								
Turbidity			95.0		%		85-115	27-NOV-18
WG2940759-4 MB								
Turbidity			<0.10		NTU		0.1	27-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	26-NOV-18 11:30	27-NOV-18 15:20	0.25	28	hours	EHTR-FM
pH							
	1	26-NOV-18 11:30	28-NOV-18 15:00	0.25	52	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2202182 were received on 27-NOV-18 09:20.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2202182-COFC

COC ID:	01-07_2018-11-26	TURNAROUND		RUSH:	

PROJECT/CLIENT INFO										OTHER INFO			
Facility Name / Job#	Regional Effects Program			Lab Name						stribution	Excel	PDF	EDD
Project Manager	Allie Ferguson			Lab Contact	L					uson@teck.com	X	X	X
Email	allie.ferguson@teck.com			Email	yudmyla.shvets@alsglobal.com			Email 2:		cait.good@teck.com	X	X	X
Address	421 Pine Ave			Address	2559 29 Street NE			Email 3:		carlie.meyer@teck.com	X	X	X
								Email 4:		teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:			X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada						
Phone Number	250.425.8048			Phone Number	1 403 407 1794			PO number					

SAMPLE DETAILS								ANALYSIS REQUESTED												
								Filt.	F	N	F	N	F	N	N					
								PRESERV.	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3						
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-01-07_WP_Q4-2018_NP	RG_DW-01-07	WP		26-Nov-18	1130	G	7		1	1	1	1	1	1	1					

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Ryan Schopman	181126/1600		11/27 9:20

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	November 26, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

5 2

Teck Coal Ltd.
ATTN: Allie Ferguson
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 27-NOV-18
Report Date: 03-DEC-18 15:36 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2202205

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 02-20_2018-11-26
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202205-1				
	Description	WP				
	Sampled Date	26-NOV-18				
	Sampled Time	12:47				
	Client ID	RG_DW-02-20_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	439				
	Hardness (as CaCO3) (mg/L)	232				
	pH (pH)	8.21				
	ORP (mV)	337				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	236 DLHC				
	Turbidity (NTU)	1.10				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	3.5				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	171				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	171				
	Ammonia as N (mg/L)	0.0158				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	1.95				
	Fluoride (F) (mg/L)	0.206				
	Ion Balance (%)	95.2				
	Nitrate (as N) (mg/L)	2.37				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.288				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0012				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	63.9				
	Anion Sum (meq/L)	4.99				
	Cation Sum (meq/L)	4.75				
	Cation - Anion Balance (%)	-2.5				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50				
	Total Organic Carbon (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	<0.00010				
	Barium (Ba)-Total (mg/L)	0.0830				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (ug/L)	0.0055				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202205-1				
	Description	WP				
	Sampled Date	26-NOV-18				
	Sampled Time	12:47				
	Client ID	RG_DW-02-20_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	62.2				
	Chromium (Cr)-Total (mg/L)	0.00027				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.00121				
	Iron (Fe)-Total (mg/L)	0.072				
	Lead (Pb)-Total (mg/L)	0.000072				
	Lithium (Li)-Total (mg/L)	0.0064				
	Magnesium (Mg)-Total (mg/L)	19.5				
	Manganese (Mn)-Total (mg/L)	0.00175				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00104				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Potassium (K)-Total (mg/L)	0.570				
	Selenium (Se)-Total (ug/L)	9.36				
	Silicon (Si)-Total (mg/L)	2.20				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	2.44				
	Strontium (Sr)-Total (mg/L)	0.209				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00102				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	<0.00010				
	Barium (Ba)-Dissolved (mg/L)	0.0867				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (ug/L)	0.0094				
	Calcium (Ca)-Dissolved (mg/L)	62.3				
	Chromium (Cr)-Dissolved (mg/L)	0.00021				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202205-1				
	Description	WP				
	Sampled Date	26-NOV-18				
	Sampled Time	12:47				
	Client ID	RG_DW-02-20_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	0.00100				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0067				
	Magnesium (Mg)-Dissolved (mg/L)	18.5				
	Manganese (Mn)-Dissolved (mg/L)	0.00085				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00111				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	0.591				
	Selenium (Se)-Dissolved (ug/L)	9.83				
	Silicon (Si)-Dissolved (mg/L)	2.28				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	2.39				
	Strontium (Sr)-Dissolved (mg/L)	0.225				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00101				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0020				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2202205-1
Matrix Spike	Boron (B)-Dissolved	MS-B	L2202205-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2202205-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2202205-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2202205-1
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2202205-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2202205-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2202205-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2202205-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2202205-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2202205-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2202205-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

Reference Information

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

02-20_2018-11-26

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Allie Ferguson

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4364859								
WG2941635-2 LCS								
Acidity (as CaCO3)			107.7		%		85-115	28-NOV-18
WG2941635-1 MB								
Acidity (as CaCO3)			1.1		mg/L		2	28-NOV-18
ALK-MAN-CL	**Water**							
Batch R4365432								
WG2942251-2 LCS								
Alkalinity, Total (as CaCO3)			103.5		%		85-115	28-NOV-18
WG2942251-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	28-NOV-18
BE-D-L-CCMS-VA	**Water**							
Batch R4367092								
WG2943364-2 LCS								
Beryllium (Be)-Dissolved			95.2		%		80-120	01-DEC-18
WG2943364-1 MB		**NP**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	01-DEC-18
BE-T-L-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-2 LCS								
Beryllium (Be)-Total			103.1		%		80-120	29-NOV-18
WG2942153-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	29-NOV-18
BR-L-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Bromide (Br)			103.8		%		85-115	27-NOV-18
WG2941508-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	27-NOV-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4365507								
WG2942497-6 LCS								
Dissolved Organic Carbon			100.5		%		80-120	28-NOV-18
WG2942497-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	28-NOV-18
C-TOT-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4365507								
WG2942497-6 LCS								
Total Organic Carbon			101.8		%		80-120	28-NOV-18
WG2942497-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	28-NOV-18
CL-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Chloride (Cl)			105.0		%		90-110	27-NOV-18
WG2941508-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	27-NOV-18
EC-L-PCT-CL	**Water**							
Batch R4365432								
WG2942251-2 LCS								
Conductivity (@ 25C)			99.2		%		90-110	28-NOV-18
WG2942251-1 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	28-NOV-18
F-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Fluoride (F)			108.2		%		90-110	27-NOV-18
WG2941508-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	27-NOV-18
HG-D-CVAA-VA	**Water**							
Batch R4366173								
WG2942332-6 LCS								
Mercury (Hg)-Dissolved			98.7		%		80-120	30-NOV-18
WG2942332-5 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	30-NOV-18
HG-T-CVAA-VA	**Water**							
Batch R4366993								
WG2944075-2 LCS								
Mercury (Hg)-Total			100.4		%		80-120	01-DEC-18
WG2944075-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	01-DEC-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4367092								
WG2943364-2 LCS								
Aluminum (Al)-Dissolved			100.3		%		80-120	01-DEC-18
Antimony (Sb)-Dissolved			97.7		%		80-120	01-DEC-18
Arsenic (As)-Dissolved			100.5		%		80-120	01-DEC-18
Barium (Ba)-Dissolved			102.6		%		80-120	01-DEC-18
Bismuth (Bi)-Dissolved			97.5		%		80-120	01-DEC-18
Boron (B)-Dissolved			95.2		%		80-120	01-DEC-18
Cadmium (Cd)-Dissolved			99.0		%		80-120	01-DEC-18
Calcium (Ca)-Dissolved			99.9		%		80-120	01-DEC-18
Chromium (Cr)-Dissolved			101.3		%		80-120	01-DEC-18
Cobalt (Co)-Dissolved			97.4		%		80-120	01-DEC-18
Copper (Cu)-Dissolved			97.7		%		80-120	01-DEC-18
Iron (Fe)-Dissolved			97.3		%		80-120	01-DEC-18
Lead (Pb)-Dissolved			99.5		%		80-120	01-DEC-18
Lithium (Li)-Dissolved			98.8		%		80-120	01-DEC-18
Magnesium (Mg)-Dissolved			99.6		%		80-120	01-DEC-18
Manganese (Mn)-Dissolved			99.6		%		80-120	01-DEC-18
Molybdenum (Mo)-Dissolved			99.3		%		80-120	01-DEC-18
Nickel (Ni)-Dissolved			96.8		%		80-120	01-DEC-18
Potassium (K)-Dissolved			100.3		%		80-120	01-DEC-18
Selenium (Se)-Dissolved			93.3		%		80-120	01-DEC-18
Silicon (Si)-Dissolved			96.7		%		60-140	01-DEC-18
Silver (Ag)-Dissolved			96.8		%		80-120	01-DEC-18
Sodium (Na)-Dissolved			104.7		%		80-120	01-DEC-18
Strontium (Sr)-Dissolved			100.6		%		80-120	01-DEC-18
Thallium (Tl)-Dissolved			95.8		%		80-120	01-DEC-18
Tin (Sn)-Dissolved			98.2		%		80-120	01-DEC-18
Titanium (Ti)-Dissolved			95.7		%		80-120	01-DEC-18
Uranium (U)-Dissolved			101.5		%		80-120	01-DEC-18
Vanadium (V)-Dissolved			98.7		%		80-120	01-DEC-18
Zinc (Zn)-Dissolved			103.8		%		80-120	01-DEC-18
WG2943364-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4367092								
WG2943364-1 MB		**NP**						
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	01-DEC-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	01-DEC-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	01-DEC-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	01-DEC-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	01-DEC-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	01-DEC-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	01-DEC-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	01-DEC-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	01-DEC-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
MET-T-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-2 LCS								
Aluminum (Al)-Total			102.9		%		80-120	29-NOV-18
Antimony (Sb)-Total			103.2		%		80-120	29-NOV-18
Arsenic (As)-Total			105.6		%		80-120	29-NOV-18
Barium (Ba)-Total			110.2		%		80-120	29-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-2 LCS								
Bismuth (Bi)-Total			100.3		%		80-120	29-NOV-18
Boron (B)-Total			100.3		%		80-120	29-NOV-18
Cadmium (Cd)-Total			103.2		%		80-120	29-NOV-18
Calcium (Ca)-Total			103.0		%		80-120	29-NOV-18
Chromium (Cr)-Total			104.3		%		80-120	29-NOV-18
Cobalt (Co)-Total			105.3		%		80-120	29-NOV-18
Copper (Cu)-Total			105.2		%		80-120	29-NOV-18
Iron (Fe)-Total			104.2		%		80-120	29-NOV-18
Lead (Pb)-Total			101.3		%		80-120	29-NOV-18
Lithium (Li)-Total			103.6		%		80-120	29-NOV-18
Magnesium (Mg)-Total			111.0		%		80-120	29-NOV-18
Manganese (Mn)-Total			106.9		%		80-120	29-NOV-18
Molybdenum (Mo)-Total			100.0		%		80-120	29-NOV-18
Nickel (Ni)-Total			104.7		%		80-120	29-NOV-18
Potassium (K)-Total			109.7		%		80-120	29-NOV-18
Selenium (Se)-Total			98.9		%		80-120	29-NOV-18
Silicon (Si)-Total			106.8		%		80-120	29-NOV-18
Silver (Ag)-Total			96.7		%		80-120	29-NOV-18
Sodium (Na)-Total			111.9		%		80-120	29-NOV-18
Strontium (Sr)-Total			101.2		%		80-120	29-NOV-18
Thallium (Tl)-Total			102.9		%		80-120	29-NOV-18
Tin (Sn)-Total			98.6		%		80-120	29-NOV-18
Titanium (Ti)-Total			108.7		%		80-120	29-NOV-18
Uranium (U)-Total			102.2		%		80-120	29-NOV-18
Vanadium (V)-Total			103.6		%		80-120	29-NOV-18
Zinc (Zn)-Total			104.3		%		80-120	29-NOV-18
WG2942153-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	29-NOV-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Boron (B)-Total			<0.010		mg/L		0.01	29-NOV-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	29-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4365979								
WG2942153-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	29-NOV-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	29-NOV-18
Iron (Fe)-Total			<0.010		mg/L		0.01	29-NOV-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	29-NOV-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	29-NOV-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	29-NOV-18
Potassium (K)-Total			<0.050		mg/L		0.05	29-NOV-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	29-NOV-18
Silicon (Si)-Total			<0.10		mg/L		0.1	29-NOV-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	29-NOV-18
Sodium (Na)-Total			<0.050		mg/L		0.05	29-NOV-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	29-NOV-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	29-NOV-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	29-NOV-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	29-NOV-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	29-NOV-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	29-NOV-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	29-NOV-18
NH3-L-F-CL	**Water**							
Batch R4365123								
WG2941930-2 LCS								
Ammonia as N			85.4		%		85-115	28-NOV-18
WG2941930-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	28-NOV-18
NO2-L-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Nitrite (as N)			109.5		%		90-110	27-NOV-18
WG2941508-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	27-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Nitrate (as N)			104.4		%		90-110	27-NOV-18
WG2941508-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	27-NOV-18
ORP-CL	**Water**							
Batch R4364328								
WG2941426-1 CRM		**CL-ORP**						
ORP			221		mV		210-230	27-NOV-18
P-T-L-COL-CL	**Water**							
Batch R4365840								
WG2942469-14 LCS								
Phosphorus (P)-Total			114.1		%		80-120	29-NOV-18
WG2942469-13 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	28-NOV-18
PH-CL	**Water**							
Batch R4365432								
WG2942251-2 LCS								
pH			7.00		pH		6.9-7.1	28-NOV-18
PO4-DO-L-COL-CL	**Water**							
Batch R4363008								
WG2940833-2 LCS								
Orthophosphate-Dissolved (as P)			101.2		%		80-120	27-NOV-18
WG2940833-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	27-NOV-18
SO4-IC-N-CL	**Water**							
Batch R4364528								
WG2941508-6 LCS								
Sulfate (SO4)			103.4		%		90-110	27-NOV-18
WG2941508-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	27-NOV-18
SOLIDS-TDS-CL	**Water**							
Batch R4365552								
WG2941263-2 LCS								
Total Dissolved Solids			94.3		%		85-115	28-NOV-18
WG2941263-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-CL	**Water**							
Batch R4365552								
WG2941263-1 MB								
Total Dissolved Solids			<10		mg/L		10	28-NOV-18
TKN-L-F-CL	**Water**							
Batch R4365013								
WG2940796-2 LCS								
Total Kjeldahl Nitrogen			95.4		%		75-125	28-NOV-18
WG2940796-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	28-NOV-18
TSS-L-CL	**Water**							
Batch R4365595								
WG2941214-4 LCS								
Total Suspended Solids			86.7		%		85-115	28-NOV-18
WG2941214-3 MB								
Total Suspended Solids			<1.0		mg/L		1	28-NOV-18
TURBIDITY-CL	**Water**							
Batch R4362828								
WG2940759-6 DUP		**L2202205-1**						
Turbidity		1.10	1.0		NTU	10	15	27-NOV-18
WG2940759-5 LCS								
Turbidity			95.0		%		85-115	27-NOV-18
WG2940759-4 MB								
Turbidity			<0.10		NTU		0.1	27-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	26-NOV-18 12:47	27-NOV-18 15:20	0.25	27	hours	EHTR-FM
pH							
	1	26-NOV-18 12:47	28-NOV-18 15:00	0.25	50	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2202205 were received on 27-NOV-18 09:20.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

Page 1

L2202205-COFC

COC ID:	02-20_2018-11-26	TURNAROUN		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program	Lab Name					
Project Manager	Allie Ferguson	Lab Contact	Lyudmyla Shvets				
Email	allie.ferguson@teck.com	Email	lyudmyla.shvets@alsglobal.com				
Address	421 Pine Avenue	Address	2559 29 Street NE				
City	Sparwood	Province	BC	City	Calgary	Province	AB
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada
Phone Number	250-425-8202			Phone Number	1 403 407 1794		

OTHER INFO

Distribution	Excel	PDF	EDD
Email 1: [illegible]uson@teck.com	X	X	X
Email 2: cait.good@teck.com	X	X	X
Email 3: carlie.meyer@teck.com	X	X	X
Email 4: teckcoal@equisonline.com			X
Email 5:			

PO number: VPO00554397

SAMPLE DETAILS

ANALYSIS REQUESTED (Filtered | F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA
								F / [illegible]SO4	N / HCL	F / HCL	N / HCL	F / HNO3	N / HNO3	N
RG_DW-02-20_WP_Q4-2018_NP	RG_DW-02-20	WP	no	26-Nov-18	1247	G	7	1	1	1	1	1	1	1

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Ryan Schopman	181126/1600		11/27 9:20

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Sampler's Signature		Date/Time	November 26, 2018

5°C

Teck Coal Ltd.
ATTN: Allie Ferguson
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 28-NOV-18
Report Date: 05-DEC-18 16:10 (MT)
Version: FINAL

Client Phone: 250-425-8048

Certificate of Analysis

Lab Work Order #: L2202872

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 03-04_2018-11-27
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202872-1				
	Description	WP				
	Sampled Date	27-NOV-18				
	Sampled Time	12:45				
	Client ID	RG_DW-03-04_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	577				
	Hardness (as CaCO3) (mg/L)	316				
	pH (pH)	8.12				
	ORP (mV)	344				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	371 DLHC				
	Turbidity (NTU)	0.21				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	187				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	187				
	Ammonia as N (mg/L)	0.0179				
	Bromide (Br) (mg/L)	0.129				
	Chloride (Cl) (mg/L)	7.07				
	Fluoride (F) (mg/L)	0.153				
	Ion Balance (%)	100				
	Nitrate (as N) (mg/L)	1.81				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.173 TKNI				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0034 RRV				
	Phosphorus (P)-Total (mg/L)	0.0025 RRV				
	Sulfate (SO4) (mg/L)	122				
	Anion Sum (meq/L)	6.62				
	Cation Sum (meq/L)	6.65				
	Cation - Anion Balance (%)	0.2				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.60				
	Total Organic Carbon (mg/L)	0.56				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	0.00012				
	Arsenic (As)-Total (mg/L)	0.00012				
	Barium (Ba)-Total (mg/L)	0.161				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.014				
	Cadmium (Cd)-Total (ug/L)	0.0148				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202872-1				
	Description	WP				
	Sampled Date	27-NOV-18				
	Sampled Time	12:45				
	Client ID	RG_DW-03-04_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	75.8				
	Chromium (Cr)-Total (mg/L)	0.00021				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.00681				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	0.000394				
	Lithium (Li)-Total (mg/L)	0.0099				
	Magnesium (Mg)-Total (mg/L)	25.7				
	Manganese (Mn)-Total (mg/L)	0.00012				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00102				
	Nickel (Ni)-Total (mg/L)	0.00180				
	Potassium (K)-Total (mg/L)	0.954				
	Selenium (Se)-Total (ug/L)	11.9				
	Silicon (Si)-Total (mg/L)	2.74				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	6.28				
	Strontium (Sr)-Total (mg/L)	0.179				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00107				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0081				
Dissolved Metals	Dissolved Mercury Filtration Location	LAB				
	Dissolved Metals Filtration Location	LAB				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	0.00010				
	Arsenic (As)-Dissolved (mg/L)	0.00011				
	Barium (Ba)-Dissolved (mg/L)	0.201				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.013				
	Cadmium (Cd)-Dissolved (ug/L)	0.0187				
	Calcium (Ca)-Dissolved (mg/L)	81.4				
	Chromium (Cr)-Dissolved (mg/L)	0.00020				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202872-1				
	Description	WP				
	Sampled Date	27-NOV-18				
	Sampled Time	12:45				
	Client ID	RG_DW-03-04_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	0.00072				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	0.000120				
	Lithium (Li)-Dissolved (mg/L)	0.0106				
	Magnesium (Mg)-Dissolved (mg/L)	27.4				
	Manganese (Mn)-Dissolved (mg/L)	0.00016				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.00106				
	Nickel (Ni)-Dissolved (mg/L)	0.00084				
	Potassium (K)-Dissolved (mg/L)	1.07				
	Selenium (Se)-Dissolved (ug/L)	12.0				
	Silicon (Si)-Dissolved (mg/L)	2.63				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	6.90				
	Strontium (Sr)-Dissolved (mg/L)	0.192				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00102				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0040				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2202872-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2202872-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2202872-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2202872-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2202872-1
Matrix Spike	Aluminum (Al)-Total	MS-B	L2202872-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2202872-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2202872-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2202872-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2202872-1
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2202872-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2202872-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2202872-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

Reference Information

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

Reference Information

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

03-04_2018-11-27

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2202872 Report Date: 05-DEC-18

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Allie Ferguson

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4374173								
WG2946613-2 LCS								
Acidity (as CaCO3)			100.1		%		85-115	04-DEC-18
WG2946613-1 MB								
Acidity (as CaCO3)			1.1		mg/L		2	04-DEC-18
ALK-MAN-CL	**Water**							
Batch R4365432								
WG2942251-11 LCS								
Alkalinity, Total (as CaCO3)			101.5		%		85-115	28-NOV-18
WG2942251-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	28-NOV-18
BE-D-L-CCMS-VA	**Water**							
Batch R4368855								
WG2943842-2 LCS								
Beryllium (Be)-Dissolved			96.9		%		80-120	01-DEC-18
WG2943842-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	01-DEC-18
WG2943842-4 MS		**L2202872-1**						
Beryllium (Be)-Dissolved			93.0		%		70-130	01-DEC-18
BE-T-L-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-2 LCS								
Beryllium (Be)-Total			95.9		%		80-120	02-DEC-18
WG2943531-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	02-DEC-18
BR-L-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Bromide (Br)			103.1		%		85-115	28-NOV-18
WG2942588-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	28-NOV-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4367708								
WG2944743-2 LCS								
Dissolved Organic Carbon			88.0		%		80-120	02-DEC-18
WG2944743-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	02-DEC-18
C-TOT-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4367708								
WG2944743-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-DEC-18
CL-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Chloride (Cl)			100.7		%		90-110	28-NOV-18
WG2942588-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	28-NOV-18
EC-L-PCT-CL	**Water**							
Batch R4365432								
WG2942251-11 LCS								
Conductivity (@ 25C)			98.6		%		90-110	28-NOV-18
WG2942251-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	28-NOV-18
F-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Fluoride (F)			103.8		%		90-110	28-NOV-18
WG2942588-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	28-NOV-18
HG-D-CVAA-VA	**Water**							
Batch R4366173								
WG2943647-2 LCS								
Mercury (Hg)-Dissolved			99.2		%		80-120	30-NOV-18
WG2943647-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	30-NOV-18
WG2943647-4 MS		**L2202872-1**						
Mercury (Hg)-Dissolved			94.7		%		70-130	30-NOV-18
HG-T-CVAA-VA	**Water**							
Batch R4370789								
WG2945493-2 LCS								
Mercury (Hg)-Total			98.6		%		80-120	04-DEC-18
WG2945493-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	04-DEC-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4368855								
WG2943842-2 LCS								
Aluminum (Al)-Dissolved			102.5		%		80-120	01-DEC-18
Antimony (Sb)-Dissolved			95.2		%		80-120	01-DEC-18
Arsenic (As)-Dissolved			101.1		%		80-120	01-DEC-18
Barium (Ba)-Dissolved			101.5		%		80-120	01-DEC-18
Bismuth (Bi)-Dissolved			102.1		%		80-120	01-DEC-18
Boron (B)-Dissolved			93.0		%		80-120	01-DEC-18
Cadmium (Cd)-Dissolved			103.8		%		80-120	01-DEC-18
Calcium (Ca)-Dissolved			97.0		%		80-120	01-DEC-18
Chromium (Cr)-Dissolved			100.3		%		80-120	01-DEC-18
Cobalt (Co)-Dissolved			102.0		%		80-120	01-DEC-18
Copper (Cu)-Dissolved			100.4		%		80-120	01-DEC-18
Iron (Fe)-Dissolved			90.3		%		80-120	01-DEC-18
Lead (Pb)-Dissolved			102.5		%		80-120	01-DEC-18
Lithium (Li)-Dissolved			94.4		%		80-120	01-DEC-18
Magnesium (Mg)-Dissolved			102.2		%		80-120	01-DEC-18
Manganese (Mn)-Dissolved			101.3		%		80-120	01-DEC-18
Molybdenum (Mo)-Dissolved			94.5		%		80-120	01-DEC-18
Nickel (Ni)-Dissolved			104.3		%		80-120	01-DEC-18
Potassium (K)-Dissolved			102.9		%		80-120	01-DEC-18
Selenium (Se)-Dissolved			104.2		%		80-120	01-DEC-18
Silicon (Si)-Dissolved			104.5		%		60-140	01-DEC-18
Silver (Ag)-Dissolved			90.7		%		80-120	01-DEC-18
Sodium (Na)-Dissolved			107.2		%		80-120	01-DEC-18
Strontium (Sr)-Dissolved			94.4		%		80-120	01-DEC-18
Thallium (Tl)-Dissolved			101.5		%		80-120	01-DEC-18
Tin (Sn)-Dissolved			95.2		%		80-120	01-DEC-18
Titanium (Ti)-Dissolved			93.8		%		80-120	01-DEC-18
Uranium (U)-Dissolved			99.9		%		80-120	01-DEC-18
Vanadium (V)-Dissolved			105.2		%		80-120	01-DEC-18
Zinc (Zn)-Dissolved			106.4		%		80-120	01-DEC-18
WG2943842-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4368855								
WG2943842-1 MB		**LF**						
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	01-DEC-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	01-DEC-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	01-DEC-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	01-DEC-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	01-DEC-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	01-DEC-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	01-DEC-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	01-DEC-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	01-DEC-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
WG2943842-4 MS		**L2202872-1**						
Aluminum (Al)-Dissolved			98.9		%		70-130	01-DEC-18
Antimony (Sb)-Dissolved			101.0		%		70-130	01-DEC-18
Arsenic (As)-Dissolved			103.4		%		70-130	01-DEC-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	01-DEC-18
Bismuth (Bi)-Dissolved			89.0		%		70-130	01-DEC-18
Boron (B)-Dissolved			92.9		%		70-130	01-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4368855								
WG2943842-4 MS		**L2202872-1**						
Cadmium (Cd)-Dissolved			106.8		%		70-130	01-DEC-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	01-DEC-18
Chromium (Cr)-Dissolved			99.5		%		70-130	01-DEC-18
Cobalt (Co)-Dissolved			99.0		%		70-130	01-DEC-18
Copper (Cu)-Dissolved			95.3		%		70-130	01-DEC-18
Iron (Fe)-Dissolved			96.3		%		70-130	01-DEC-18
Lead (Pb)-Dissolved			91.4		%		70-130	01-DEC-18
Lithium (Li)-Dissolved			96.5		%		70-130	01-DEC-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	01-DEC-18
Manganese (Mn)-Dissolved			95.8		%		70-130	01-DEC-18
Molybdenum (Mo)-Dissolved			102.3		%		70-130	01-DEC-18
Nickel (Ni)-Dissolved			95.5		%		70-130	01-DEC-18
Potassium (K)-Dissolved			102.1		%		70-130	01-DEC-18
Selenium (Se)-Dissolved			99.6		%		70-130	01-DEC-18
Silicon (Si)-Dissolved			98.4		%		70-130	01-DEC-18
Silver (Ag)-Dissolved			96.7		%		70-130	01-DEC-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	01-DEC-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	01-DEC-18
Thallium (Tl)-Dissolved			91.9		%		70-130	01-DEC-18
Tin (Sn)-Dissolved			100.5		%		70-130	01-DEC-18
Titanium (Ti)-Dissolved			97.1		%		70-130	01-DEC-18
Uranium (U)-Dissolved			95.3		%		70-130	01-DEC-18
Vanadium (V)-Dissolved			104.4		%		70-130	01-DEC-18
Zinc (Zn)-Dissolved			105.3		%		70-130	01-DEC-18
MET-T-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-2 LCS								
Aluminum (Al)-Total			99.4		%		80-120	02-DEC-18
Antimony (Sb)-Total			101.5		%		80-120	02-DEC-18
Arsenic (As)-Total			97.1		%		80-120	02-DEC-18
Barium (Ba)-Total			94.7		%		80-120	02-DEC-18
Bismuth (Bi)-Total			97.9		%		80-120	02-DEC-18
Boron (B)-Total			103.5		%		80-120	02-DEC-18
Cadmium (Cd)-Total			96.7		%		80-120	02-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-2 LCS								
Calcium (Ca)-Total			97.4		%		80-120	02-DEC-18
Chromium (Cr)-Total			98.5		%		80-120	02-DEC-18
Cobalt (Co)-Total			95.9		%		80-120	02-DEC-18
Copper (Cu)-Total			97.1		%		80-120	02-DEC-18
Iron (Fe)-Total			96.3		%		80-120	02-DEC-18
Lead (Pb)-Total			97.6		%		80-120	02-DEC-18
Lithium (Li)-Total			92.2		%		80-120	02-DEC-18
Magnesium (Mg)-Total			103.7		%		80-120	02-DEC-18
Manganese (Mn)-Total			100.1		%		80-120	02-DEC-18
Molybdenum (Mo)-Total			96.0		%		80-120	02-DEC-18
Nickel (Ni)-Total			95.7		%		80-120	02-DEC-18
Potassium (K)-Total			99.8		%		80-120	02-DEC-18
Selenium (Se)-Total			99.0		%		80-120	02-DEC-18
Silicon (Si)-Total			101.6		%		80-120	02-DEC-18
Silver (Ag)-Total			96.8		%		80-120	02-DEC-18
Sodium (Na)-Total			99.0		%		80-120	02-DEC-18
Strontium (Sr)-Total			98.4		%		80-120	02-DEC-18
Thallium (Tl)-Total			101.1		%		80-120	02-DEC-18
Tin (Sn)-Total			98.2		%		80-120	02-DEC-18
Titanium (Ti)-Total			96.7		%		80-120	02-DEC-18
Uranium (U)-Total			99.4		%		80-120	02-DEC-18
Vanadium (V)-Total			100.8		%		80-120	02-DEC-18
Zinc (Zn)-Total			98.2		%		80-120	02-DEC-18
WG2943531-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	02-DEC-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Boron (B)-Total			<0.010		mg/L		0.01	02-DEC-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	02-DEC-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	02-DEC-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	02-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-1 MB								
Copper (Cu)-Total			<0.00050		mg/L		0.0005	02-DEC-18
Iron (Fe)-Total			<0.010		mg/L		0.01	02-DEC-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	02-DEC-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	02-DEC-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	02-DEC-18
Potassium (K)-Total			<0.050		mg/L		0.05	02-DEC-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Silicon (Si)-Total			<0.10		mg/L		0.1	02-DEC-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	02-DEC-18
Sodium (Na)-Total			<0.050		mg/L		0.05	02-DEC-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	02-DEC-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	02-DEC-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	02-DEC-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	02-DEC-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	02-DEC-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	02-DEC-18
NH3-L-F-CL	**Water**							
Batch R4366001								
WG2942960-3 DUP		**L2202872-1**						
Ammonia as N		0.0179	0.0182		mg/L	1.7	20	29-NOV-18
WG2942960-2 LCS								
Ammonia as N			101.0		%		85-115	29-NOV-18
WG2942960-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	29-NOV-18
WG2942960-4 MS		**L2202872-1**						
Ammonia as N			91.7		%		75-125	29-NOV-18
NO2-L-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Nitrite (as N)			106.2		%		90-110	28-NOV-18
WG2942588-9 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	28-NOV-18
NO3-L-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Nitrate (as N)			101.1		%		90-110	28-NOV-18
WG2942588-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	28-NOV-18
ORP-CL	**Water**							
Batch R4366431								
WG2943454-3 CRM		**CL-ORP**						
ORP			222		mV		210-230	29-NOV-18
P-T-L-COL-CL	**Water**							
Batch R4366828								
WG2943693-2 LCS								
Phosphorus (P)-Total			102.8		%		80-120	30-NOV-18
WG2943693-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	30-NOV-18
PH-CL	**Water**							
Batch R4365432								
WG2942251-11 LCS								
pH			6.96		pH		6.9-7.1	28-NOV-18
PO4-DO-L-COL-CL	**Water**							
Batch R4365089								
WG2941803-10 LCS								
Orthophosphate-Dissolved (as P)			102.6		%		80-120	28-NOV-18
WG2941803-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	28-NOV-18
SO4-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Sulfate (SO4)			100.7		%		90-110	28-NOV-18
WG2942588-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	28-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-CL	**Water**							
Batch R4366806								
WG2942359-6 DUP		**L2202872-1**						
Total Dissolved Solids		371	375		mg/L	1.1	20	29-NOV-18
WG2942359-5 LCS								
Total Dissolved Solids			98.1		%		85-115	29-NOV-18
WG2942359-4 MB								
Total Dissolved Solids			<10		mg/L		10	29-NOV-18
TKN-L-F-CL	**Water**							
Batch R4367185								
WG2943248-3 DUP		**L2202872-1**						
Total Kjeldahl Nitrogen		0.173	0.172		mg/L	0.6	20	01-DEC-18
WG2943248-2 LCS								
Total Kjeldahl Nitrogen			100.3		%		75-125	01-DEC-18
WG2943248-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	01-DEC-18
WG2943248-4 MS		**L2202872-1**						
Total Kjeldahl Nitrogen			78.1		%		70-130	01-DEC-18
TSS-L-CL	**Water**							
Batch R4367042								
WG2943603-2 LCS								
Total Suspended Solids			96.7		%		85-115	30-NOV-18
WG2943603-1 MB								
Total Suspended Solids			<1.0		mg/L		1	30-NOV-18
TURBIDITY-CL	**Water**							
Batch R4365117								
WG2941919-5 LCS								
Turbidity			95.5		%		85-115	28-NOV-18
WG2941919-4 MB								
Turbidity			<0.10		NTU		0.1	28-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	27-NOV-18 12:45	29-NOV-18 13:30	0.25	49	hours	EHTR-FM
pH							
	1	27-NOV-18 12:45	28-NOV-18 15:00	0.25	26	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2202872 were received on 28-NOV-18 09:35.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2202872-COFC

COC ID:	03-04_2018-11-27	TURNAROUND TIME	

PROJECT/CLIENT INFO				LABO				R INFO			
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Cal				Excel	PDF	EDD
Project Manager	Allie Ferguson			Lab Contact	Lyudmyl.				X	X	X
Email	allie.ferguson@teck.com			Email	lyudmyla.shvets@alsglobal.com			Email 2:	X	X	X
Address	421 Pine Avenue			Address	2559 29 Street NE			Email 3:	X	X	X
								Email 4:			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada				
Phone Number	250.425.8048			Phone Number	1 403 407 1794			PO number	VPO00554397		

SAMPLE DETAILS								ANALYSIS REQUESTED											Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								Fil.	F	N	F	N	F	N	N				
								PRESERV.	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3					
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA				
RG_DW-03-04_WP_Q4-2018_NP	RG_DW-03-04	WP	no	27-Nov-18	1245	G	7		1	1	1	1	1	1	1				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Ryan Schopman	181127/1600		11/28 9:35

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	November 27, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

3°C

Teck Coal Ltd.
ATTN: Allie Ferguson
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 28-NOV-18
Report Date: 04-DEC-18 13:36 (MT)
Version: FINAL

Client Phone: 250-425-8048

Certificate of Analysis

Lab Work Order #: L2202912

Project P.O. #: VPO00554397
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: 07-01_2018-11-27
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202912-1				
	Description	WP				
	Sampled Date	27-NOV-18				
	Sampled Time	09:10				
	Client ID	RG_DW-07-01_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	1550				
	Hardness (as CaCO3) (mg/L)	987				
	pH (pH)	7.80				
	ORP (mV)	435				
	Total Suspended Solids (mg/L)	4.9				
	Total Dissolved Solids (mg/L)	1240 DLHC				
	Turbidity (NTU)	6.06				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	11.1				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	300				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	300				
	Ammonia as N (mg/L)	0.0153				
	Bromide (Br) (mg/L)	<0.25 DLHC				
	Chloride (Cl) (mg/L)	24.6 DLHC				
	Fluoride (F) (mg/L)	0.15 DLHC				
	Ion Balance (%)	109				
	Nitrate (as N) (mg/L)	3.15 DLHC				
	Nitrite (as N) (mg/L)	<0.0050 DLHC				
	Total Kjeldahl Nitrogen (mg/L)	0.140 TKNI				
	Orthophosphate-Dissolved (as P) (mg/L)	0.0014				
	Phosphorus (P)-Total (mg/L)	0.0063				
	Sulfate (SO4) (mg/L)	611 DLHC				
	Anion Sum (meq/L)	19.6				
	Cation Sum (meq/L)	21.5				
	Cation - Anion Balance (%)	4.5				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.13				
	Total Organic Carbon (mg/L)	1.45				
Total Metals	Aluminum (Al)-Total (mg/L)	0.0560				
	Antimony (Sb)-Total (mg/L)	0.00027				
	Arsenic (As)-Total (mg/L)	0.00027				
	Barium (Ba)-Total (mg/L)	0.118				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.070				
	Cadmium (Cd)-Total (ug/L)	0.0620				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202912-1				
	Description	WP				
	Sampled Date	27-NOV-18				
	Sampled Time	09:10				
	Client ID	RG_DW-07-01_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	209				
	Chromium (Cr)-Total (mg/L)	0.00038				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	0.0120				
	Iron (Fe)-Total (mg/L)	0.471				
	Lead (Pb)-Total (mg/L)	0.00119				
	Lithium (Li)-Total (mg/L)	0.0257				
	Magnesium (Mg)-Total (mg/L)	96.1				
	Manganese (Mn)-Total (mg/L)	0.0173				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.000903				
	Nickel (Ni)-Total (mg/L)	0.00084				
	Potassium (K)-Total (mg/L)	2.55				
	Selenium (Se)-Total (ug/L)	9.16				
	Silicon (Si)-Total (mg/L)	3.41				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	34.7				
	Strontium (Sr)-Total (mg/L)	0.702				
	Thallium (Tl)-Total (mg/L)	0.000021				
	Tin (Sn)-Total (mg/L)	0.00029				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.00367				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	0.0715				
Dissolved Metals	Dissolved Mercury Filtration Location	LAB				
	Dissolved Metals Filtration Location	LAB				
	Aluminum (Al)-Dissolved (mg/L)	<0.0030				
	Antimony (Sb)-Dissolved (mg/L)	0.00026				
	Arsenic (As)-Dissolved (mg/L)	0.00018				
	Barium (Ba)-Dissolved (mg/L)	0.135				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.062				
	Cadmium (Cd)-Dissolved (ug/L)	0.0606				
	Calcium (Ca)-Dissolved (mg/L)	228				
	Chromium (Cr)-Dissolved (mg/L)	0.00018				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2202912-1				
	Description	WP				
	Sampled Date	27-NOV-18				
	Sampled Time	09:10				
	Client ID	RG_DW-07-01_WP_Q4-2018_NP				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	0.00069				
	Iron (Fe)-Dissolved (mg/L)	0.259				
	Lead (Pb)-Dissolved (mg/L)	0.000153				
	Lithium (Li)-Dissolved (mg/L)	0.0290				
	Magnesium (Mg)-Dissolved (mg/L)	101				
	Manganese (Mn)-Dissolved (mg/L)	0.0153				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000954				
	Nickel (Ni)-Dissolved (mg/L)	0.00073				
	Potassium (K)-Dissolved (mg/L)	2.94				
	Selenium (Se)-Dissolved (ug/L)	9.02				
	Silicon (Si)-Dissolved (mg/L)	3.12				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	39.1				
	Strontium (Sr)-Dissolved (mg/L)	0.779				
	Thallium (Tl)-Dissolved (mg/L)	0.000018				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.00344				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0689				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2202912-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2202912-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2202912-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2202912-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2202912-1
Matrix Spike	Aluminum (Al)-Total	MS-B	L2202912-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2202912-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2202912-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2202912-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2202912-1
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2202912-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2202912-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2202912-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

Reference Information

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

Reference Information

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

07-01_2018-11-27

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Allie Ferguson

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4365784								
WG2942518-2 LCS								
Acidity (as CaCO3)			102.8		%		85-115	29-NOV-18
WG2942518-1 MB								
Acidity (as CaCO3)			1.1		mg/L		2	29-NOV-18
ALK-MAN-CL	**Water**							
Batch R4365432								
WG2942251-11 LCS								
Alkalinity, Total (as CaCO3)			101.5		%		85-115	28-NOV-18
WG2942251-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	28-NOV-18
BE-D-L-CCMS-VA	**Water**							
Batch R4368855								
WG2943842-2 LCS								
Beryllium (Be)-Dissolved			96.9		%		80-120	01-DEC-18
WG2943842-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	01-DEC-18
BE-T-L-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-2 LCS								
Beryllium (Be)-Total			95.9		%		80-120	02-DEC-18
WG2943531-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	02-DEC-18
BR-L-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Bromide (Br)			103.1		%		85-115	28-NOV-18
WG2942588-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	28-NOV-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4366987								
WG2944090-2 LCS								
Dissolved Organic Carbon			97.7		%		80-120	30-NOV-18
WG2944090-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	30-NOV-18
C-TOT-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4366987								
WG2944090-2 LCS								
Total Organic Carbon			98.6		%		80-120	30-NOV-18
WG2944090-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-NOV-18
CL-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Chloride (Cl)			100.7		%		90-110	28-NOV-18
WG2942588-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	28-NOV-18
EC-L-PCT-CL	**Water**							
Batch R4365432								
WG2942251-11 LCS								
Conductivity (@ 25C)			98.6		%		90-110	28-NOV-18
WG2942251-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	28-NOV-18
F-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Fluoride (F)			103.8		%		90-110	28-NOV-18
WG2942588-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	28-NOV-18
HG-D-CVAA-VA	**Water**							
Batch R4366173								
WG2943647-3 DUP		**L2202912-1**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	30-NOV-18
WG2943647-2 LCS								
Mercury (Hg)-Dissolved			99.2		%		80-120	30-NOV-18
WG2943647-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	30-NOV-18
HG-T-CVAA-VA	**Water**							
Batch R4370789								
WG2945493-2 LCS								
Mercury (Hg)-Total			98.6		%		80-120	04-DEC-18
WG2945493-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	04-DEC-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4368855								
WG2943842-2 LCS								
Aluminum (Al)-Dissolved			102.5		%		80-120	01-DEC-18
Antimony (Sb)-Dissolved			95.2		%		80-120	01-DEC-18
Arsenic (As)-Dissolved			101.1		%		80-120	01-DEC-18
Barium (Ba)-Dissolved			101.5		%		80-120	01-DEC-18
Bismuth (Bi)-Dissolved			102.1		%		80-120	01-DEC-18
Boron (B)-Dissolved			93.0		%		80-120	01-DEC-18
Cadmium (Cd)-Dissolved			103.8		%		80-120	01-DEC-18
Calcium (Ca)-Dissolved			97.0		%		80-120	01-DEC-18
Chromium (Cr)-Dissolved			100.3		%		80-120	01-DEC-18
Cobalt (Co)-Dissolved			102.0		%		80-120	01-DEC-18
Copper (Cu)-Dissolved			100.4		%		80-120	01-DEC-18
Iron (Fe)-Dissolved			90.3		%		80-120	01-DEC-18
Lead (Pb)-Dissolved			102.5		%		80-120	01-DEC-18
Lithium (Li)-Dissolved			94.4		%		80-120	01-DEC-18
Magnesium (Mg)-Dissolved			102.2		%		80-120	01-DEC-18
Manganese (Mn)-Dissolved			101.3		%		80-120	01-DEC-18
Molybdenum (Mo)-Dissolved			94.5		%		80-120	01-DEC-18
Nickel (Ni)-Dissolved			104.3		%		80-120	01-DEC-18
Potassium (K)-Dissolved			102.9		%		80-120	01-DEC-18
Selenium (Se)-Dissolved			104.2		%		80-120	01-DEC-18
Silicon (Si)-Dissolved			104.5		%		60-140	01-DEC-18
Silver (Ag)-Dissolved			90.7		%		80-120	01-DEC-18
Sodium (Na)-Dissolved			107.2		%		80-120	01-DEC-18
Strontium (Sr)-Dissolved			94.4		%		80-120	01-DEC-18
Thallium (Tl)-Dissolved			101.5		%		80-120	01-DEC-18
Tin (Sn)-Dissolved			95.2		%		80-120	01-DEC-18
Titanium (Ti)-Dissolved			93.8		%		80-120	01-DEC-18
Uranium (U)-Dissolved			99.9		%		80-120	01-DEC-18
Vanadium (V)-Dissolved			105.2		%		80-120	01-DEC-18
Zinc (Zn)-Dissolved			106.4		%		80-120	01-DEC-18
WG2943842-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4368855								
WG2943842-1 MB		**LF**						
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	01-DEC-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	01-DEC-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	01-DEC-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	01-DEC-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	01-DEC-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	01-DEC-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	01-DEC-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	01-DEC-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	01-DEC-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	01-DEC-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	01-DEC-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	01-DEC-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	01-DEC-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	01-DEC-18
MET-T-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-2 LCS								
Aluminum (Al)-Total			99.4		%		80-120	02-DEC-18
Antimony (Sb)-Total			101.5		%		80-120	02-DEC-18
Arsenic (As)-Total			97.1		%		80-120	02-DEC-18
Barium (Ba)-Total			94.7		%		80-120	02-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-2 LCS								
Bismuth (Bi)-Total			97.9		%		80-120	02-DEC-18
Boron (B)-Total			103.5		%		80-120	02-DEC-18
Cadmium (Cd)-Total			96.7		%		80-120	02-DEC-18
Calcium (Ca)-Total			97.4		%		80-120	02-DEC-18
Chromium (Cr)-Total			98.5		%		80-120	02-DEC-18
Cobalt (Co)-Total			95.9		%		80-120	02-DEC-18
Copper (Cu)-Total			97.1		%		80-120	02-DEC-18
Iron (Fe)-Total			96.3		%		80-120	02-DEC-18
Lead (Pb)-Total			97.6		%		80-120	02-DEC-18
Lithium (Li)-Total			92.2		%		80-120	02-DEC-18
Magnesium (Mg)-Total			103.7		%		80-120	02-DEC-18
Manganese (Mn)-Total			100.1		%		80-120	02-DEC-18
Molybdenum (Mo)-Total			96.0		%		80-120	02-DEC-18
Nickel (Ni)-Total			95.7		%		80-120	02-DEC-18
Potassium (K)-Total			99.8		%		80-120	02-DEC-18
Selenium (Se)-Total			99.0		%		80-120	02-DEC-18
Silicon (Si)-Total			101.6		%		80-120	02-DEC-18
Silver (Ag)-Total			96.8		%		80-120	02-DEC-18
Sodium (Na)-Total			99.0		%		80-120	02-DEC-18
Strontium (Sr)-Total			98.4		%		80-120	02-DEC-18
Thallium (Tl)-Total			101.1		%		80-120	02-DEC-18
Tin (Sn)-Total			98.2		%		80-120	02-DEC-18
Titanium (Ti)-Total			96.7		%		80-120	02-DEC-18
Uranium (U)-Total			99.4		%		80-120	02-DEC-18
Vanadium (V)-Total			100.8		%		80-120	02-DEC-18
Zinc (Zn)-Total			98.2		%		80-120	02-DEC-18
WG2943531-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	02-DEC-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Boron (B)-Total			<0.010		mg/L		0.01	02-DEC-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	02-DEC-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4368547								
WG2943531-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	02-DEC-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	02-DEC-18
Iron (Fe)-Total			<0.010		mg/L		0.01	02-DEC-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	02-DEC-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	02-DEC-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	02-DEC-18
Potassium (K)-Total			<0.050		mg/L		0.05	02-DEC-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	02-DEC-18
Silicon (Si)-Total			<0.10		mg/L		0.1	02-DEC-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	02-DEC-18
Sodium (Na)-Total			<0.050		mg/L		0.05	02-DEC-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	02-DEC-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	02-DEC-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	02-DEC-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	02-DEC-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	02-DEC-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	02-DEC-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	02-DEC-18
NH3-L-F-CL	**Water**							
Batch R4366001								
WG2942960-2 LCS								
Ammonia as N			101.0		%		85-115	29-NOV-18
WG2942960-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	29-NOV-18
NO2-L-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Nitrite (as N)			106.2		%		90-110	28-NOV-18
WG2942588-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	28-NOV-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Nitrate (as N)			101.1		%		90-110	28-NOV-18
WG2942588-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	28-NOV-18
ORP-CL	**Water**							
Batch R4366431								
WG2943454-3 CRM		**CL-ORP**						
ORP			222		mV		210-230	29-NOV-18
P-T-L-COL-CL	**Water**							
Batch R4366828								
WG2943693-2 LCS								
Phosphorus (P)-Total			102.8		%		80-120	30-NOV-18
WG2943693-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	30-NOV-18
PH-CL	**Water**							
Batch R4365432								
WG2942251-11 LCS								
pH			6.96		pH		6.9-7.1	28-NOV-18
PO4-DO-L-COL-CL	**Water**							
Batch R4365089								
WG2941803-10 LCS								
Orthophosphate-Dissolved (as P)			102.6		%		80-120	28-NOV-18
WG2941803-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	28-NOV-18
SO4-IC-N-CL	**Water**							
Batch R4365599								
WG2942588-10 LCS								
Sulfate (SO4)			100.7		%		90-110	28-NOV-18
WG2942588-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	28-NOV-18
SOLIDS-TDS-CL	**Water**							
Batch R4366806								
WG2942359-5 LCS								
Total Dissolved Solids			98.1		%		85-115	29-NOV-18
WG2942359-4 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-CL	**Water**							
Batch R4366806								
WG2942359-4 MB								
Total Dissolved Solids			<10		mg/L		10	29-NOV-18
TKN-L-F-CL	**Water**							
Batch R4367185								
WG2943248-2 LCS								
Total Kjeldahl Nitrogen			100.3		%		75-125	01-DEC-18
WG2943248-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	01-DEC-18
TSS-L-CL	**Water**							
Batch R4367042								
WG2943603-2 LCS								
Total Suspended Solids			96.7		%		85-115	30-NOV-18
WG2943603-1 MB								
Total Suspended Solids			<1.0		mg/L		1	30-NOV-18
TURBIDITY-CL	**Water**							
Batch R4365117								
WG2941919-8 LCS								
Turbidity			96.5		%		85-115	28-NOV-18
WG2941919-7 MB								
Turbidity			<0.10		NTU		0.1	28-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	27-NOV-18 09:10	29-NOV-18 13:30	0.25	52	hours	EHTR-FM
pH							
	1	27-NOV-18 09:10	28-NOV-18 15:00	0.25	30	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2202912 were received on 28-NOV-18 09:35.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

Page 1 of

L2202912-COFC

COC ID:	07-01_2018-11-27	TURNAROUND TIM	

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program		
Project Manager	Allie Ferguson		
Email	allie.ferguson@teck.com		
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LAB

Lab Name	ALS Ca		
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Phone Number	1 403 407 1794		

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Email 2:	cait.good@teck.com	X	X	X
Email 3:	carlie.meyer@teck.com	X	X	X
Email 4:	teckcoal@equisonline.com			X
Email 5:				
PO number	VPO00554397			

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIELD	F	N	F	N	F	N	N					
								PRESERV.	H2SO4	H2SO4	HCL	HCL	HNO3	HNO3						
								ANALYSIS	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	HG-T-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_DW-07-01_WP_Q4-2018_NP	RG_DW-07-01	WP	no	27-Nov-18	0910	G	7		1	1	1	1	1	1	1					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION: Ryan Schopman

DATE/TIME: 18/11/27/1600

ACCEPTED BY/AFFILIATION:

DATE/TIME: 11/28 9:35

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Ryan Schopman	Mobile #	250-551-1142
Sampler's Signature		Date/Time	November 27, 2018

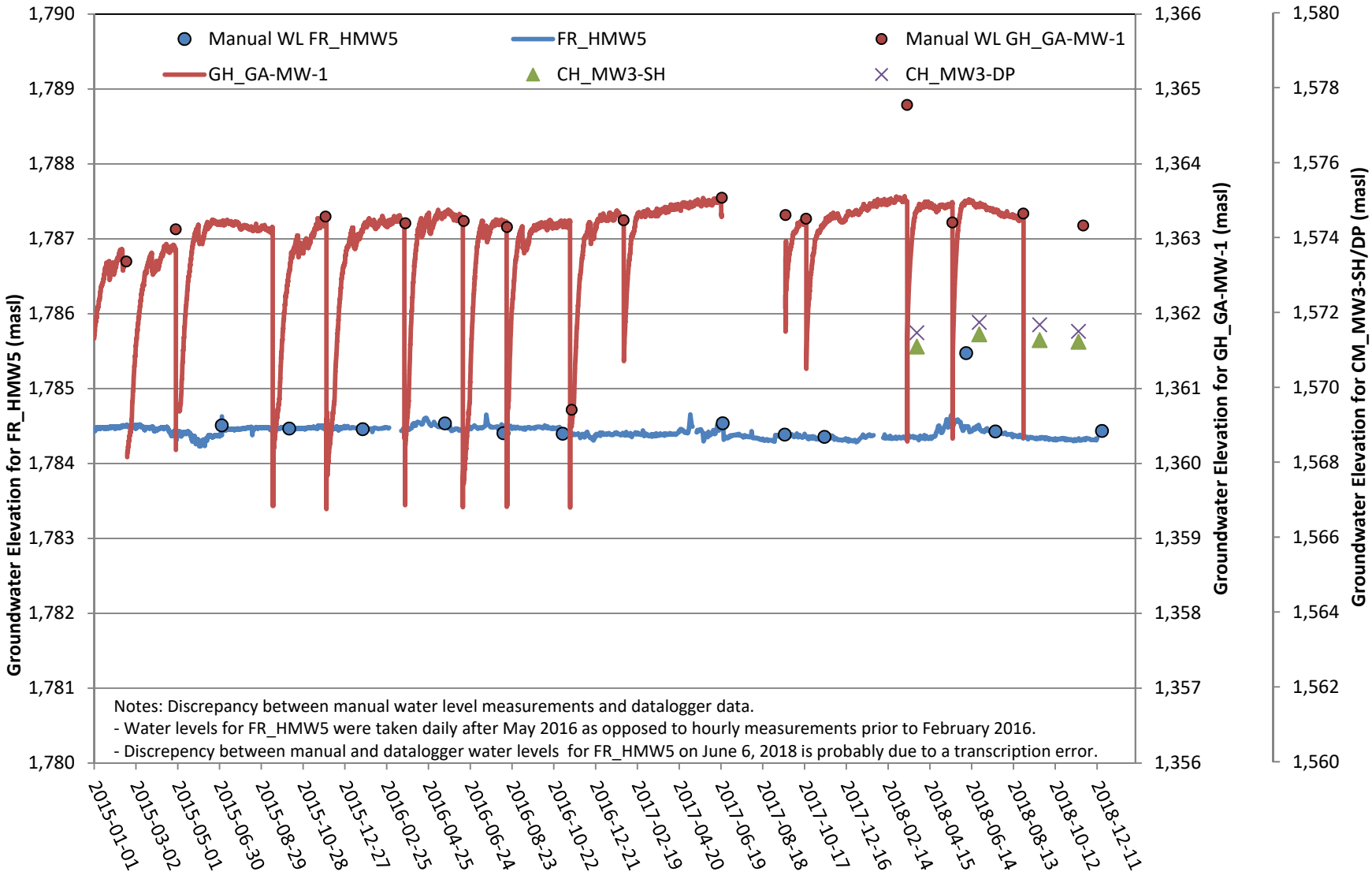
3°C

Appendix VI

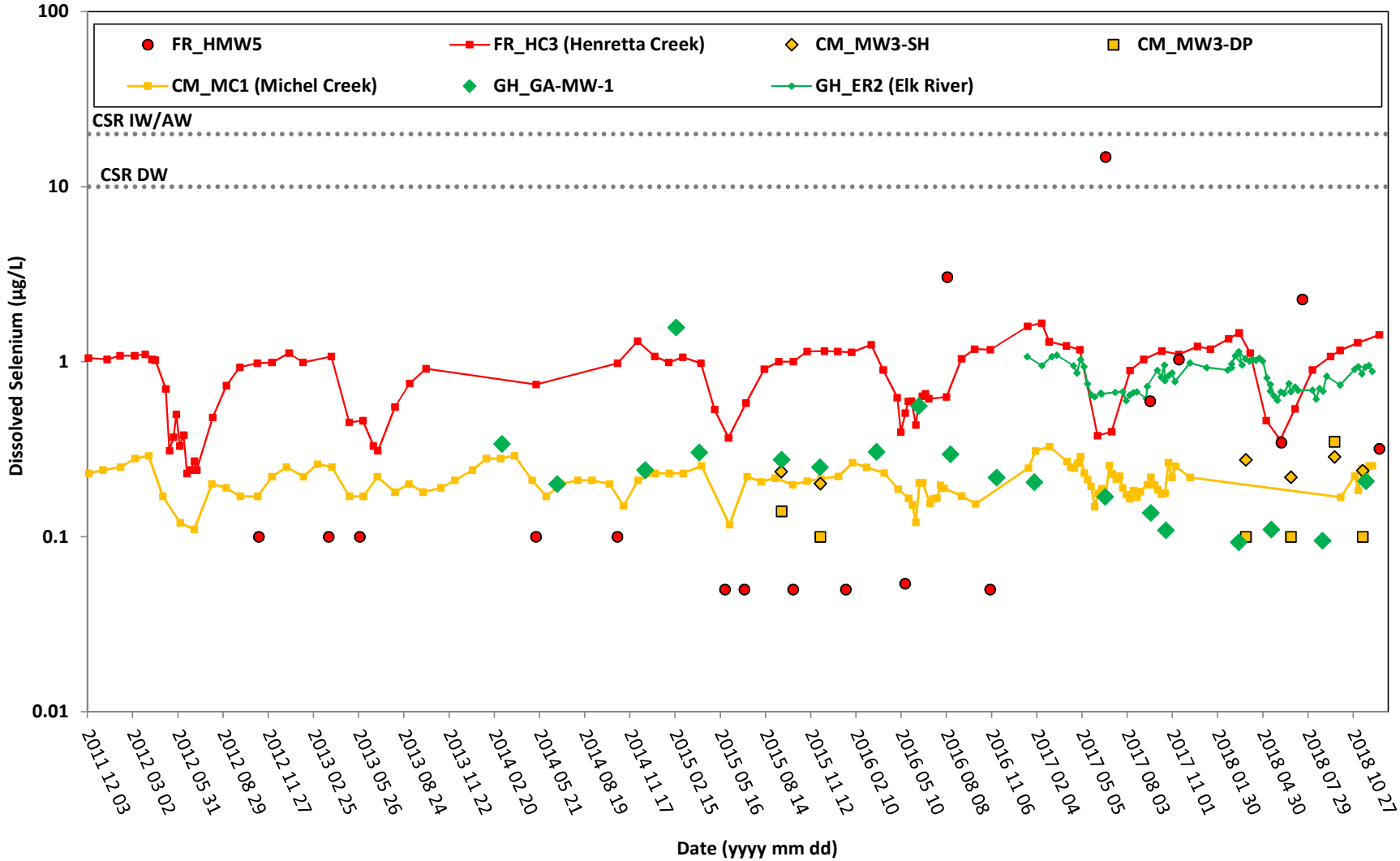
Time-Series Graphs

- Graph B-1: Groundwater Elevations in Background Wells
- Graph B-2: Selenium Concentrations in Background Wells
- Graph B-3: Sulphate Concentrations in Background Wells
- Graph 1-1: Groundwater Elevation of Study Area 1 Wells
- Graph 1-2 (1): Selenium Concentrations in Study Area 1
- Graph 1-2 (2): Selenium Concentrations in Study Area 1
- Graph 1-3 (1): Nitrate Concentrations in Study Area 1
- Graph 1-3 (2): Nitrate Concentrations in Study Area 1
- Graph 2-1: Groundwater Elevation of Study Area 2 Wells
- Graph 2-2: Selenium Concentrations in Study Area 2
- Graph 3-1: Groundwater Elevation of Study Area 3
- Graph 3-2: Selenium Concentrations in Study Area 3
- Graph 3-3: Sulphate Concentrations in Study Area 3
- Graph 4-1: Groundwater Elevation of Study Area 4 Wells
- Graph 4-2: Selenium Concentrations in Study Area 4
- Graph 4-3: Nitrate Concentrations in Study Area 4
- Graph 4-4: Sulphate Concentrations in Study Area 4
- Graph 6-1: Groundwater Elevation of Study Area 6 Well
- Graph 6-2: Selenium Concentrations in Study Area 6
- Graph 7-1: Groundwater Elevation of Study Area 7 Well
- Graph 7-2: Selenium Concentrations in Study Area 7
- Graph 8-1: Groundwater and Surface Water Elevation in Study Area 8
- Graph 8-2: Selenium Concentrations in Study Area 8
- Graph 9-1: Groundwater and Surface Water Elevation in Study Area 9
- Graph 9-2: Selenium Concentrations in Study Area 9
- Graph 9-3: Nitrate Concentrations in Study Area 9
- Graph 9-4: Sulphate Concentrations in Study Area 9
- Graph 10-1: Groundwater Elevation of Study Area 10 Wells
- Graph 10-2: Selenium Concentrations in Study Area 10
- Graph 11-1: Groundwater Elevation of Study Area 11 Wells
- Graph 11-2: Selenium Concentrations in Study Area 11
- Graph 11-3: Sulphate Concentrations in Study Area 11
- Graph 12-1: Groundwater Elevation and Pumping Rate in Study Area 12
- Graph 12-2: Selenium Concentrations in Study Area 12 and Elk River Water Level

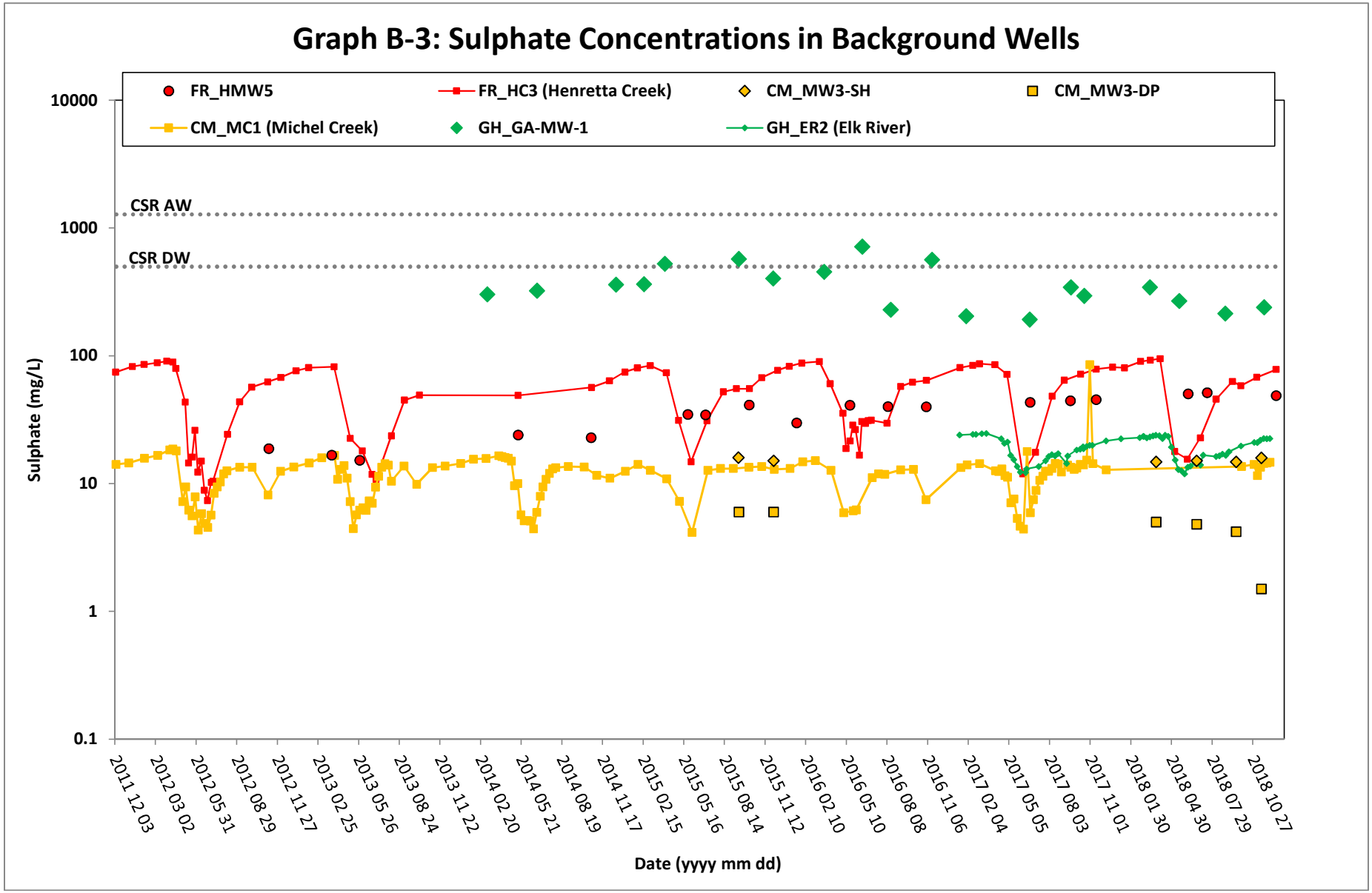
Graph B-1: Groundwater Elevation in Background Wells



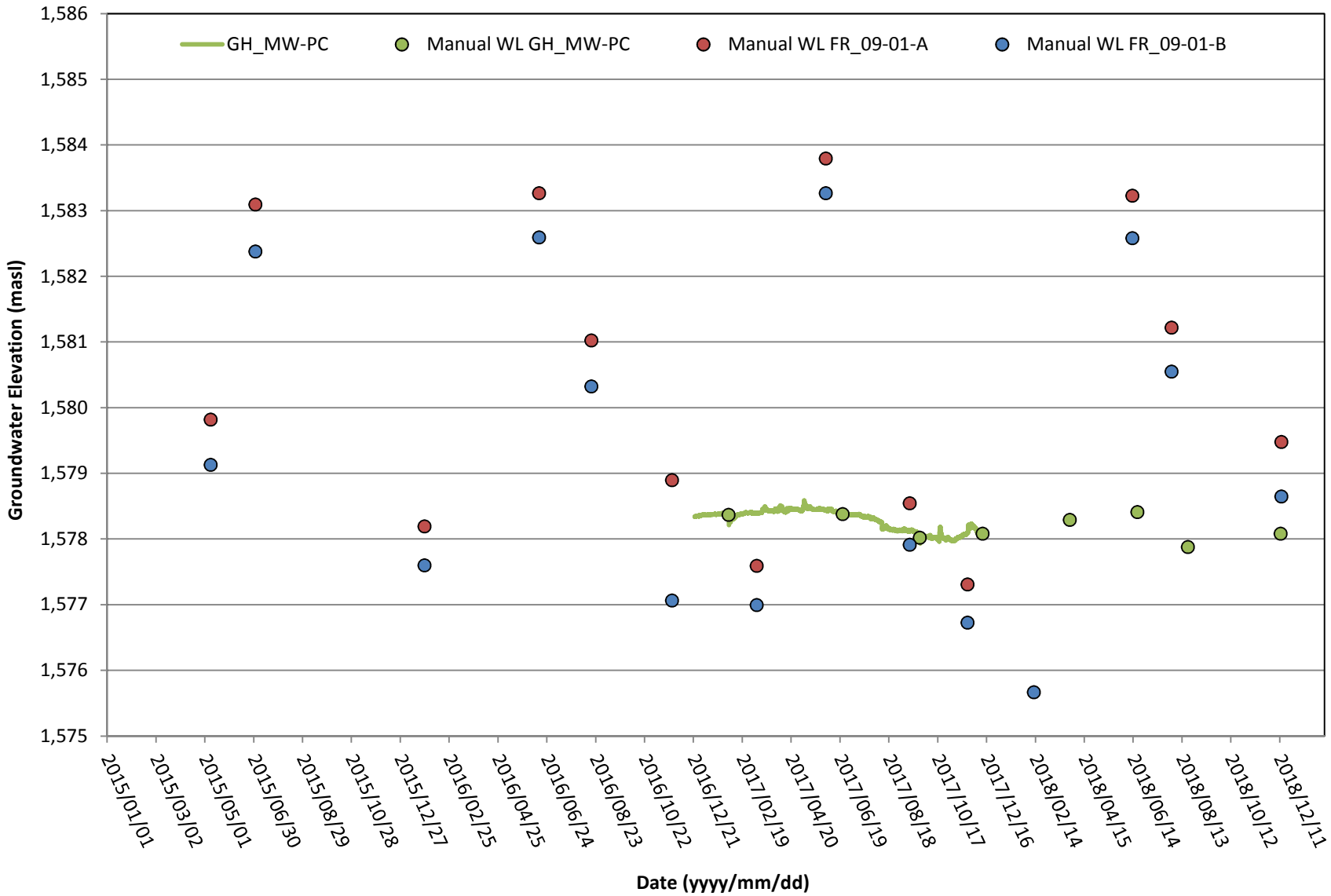
Graph B-2: Selenium Concentrations in Background Wells



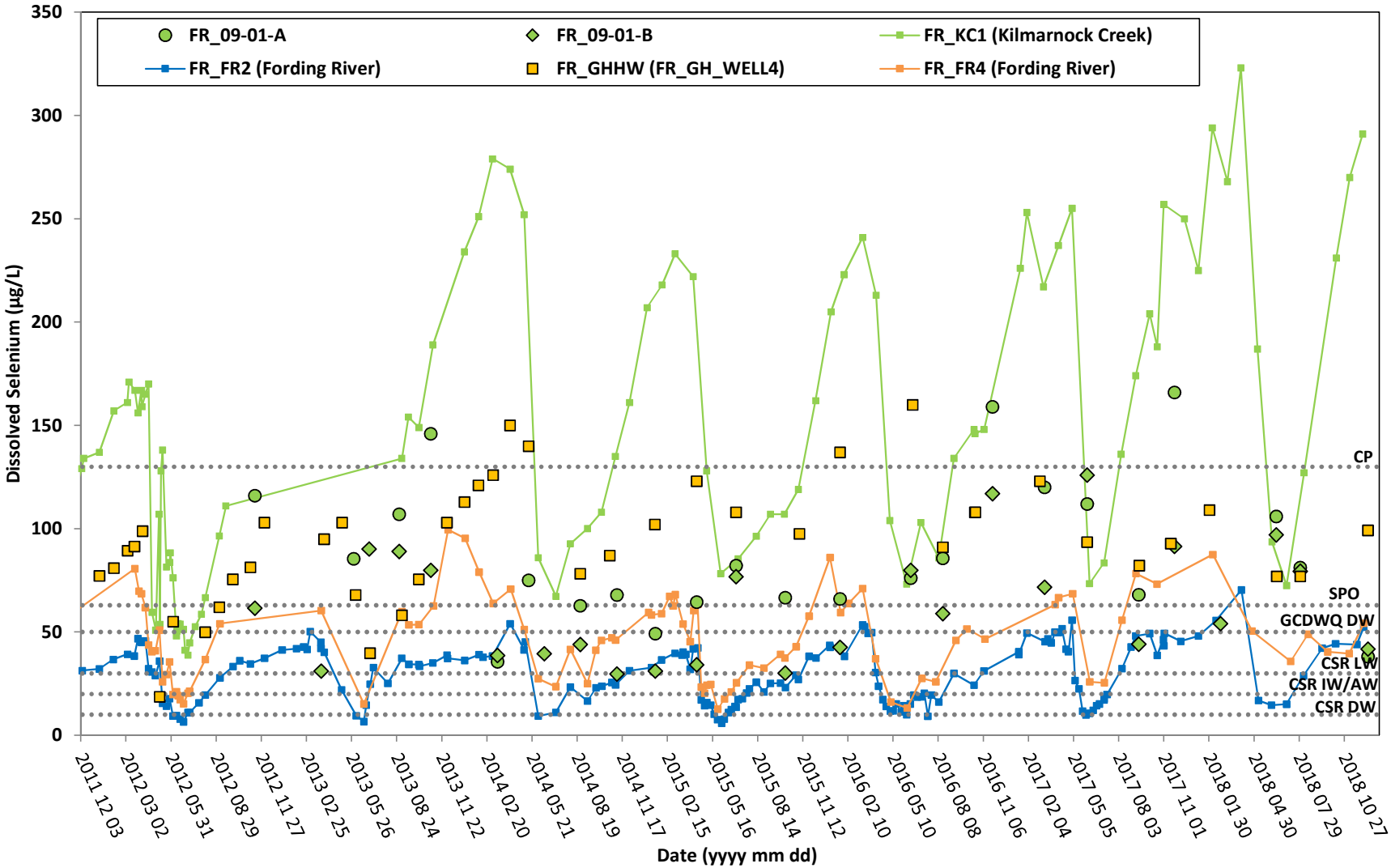
Graph B-3: Sulphate Concentrations in Background Wells



Graph 1-1: Groundwater Elevation in Study Area 1

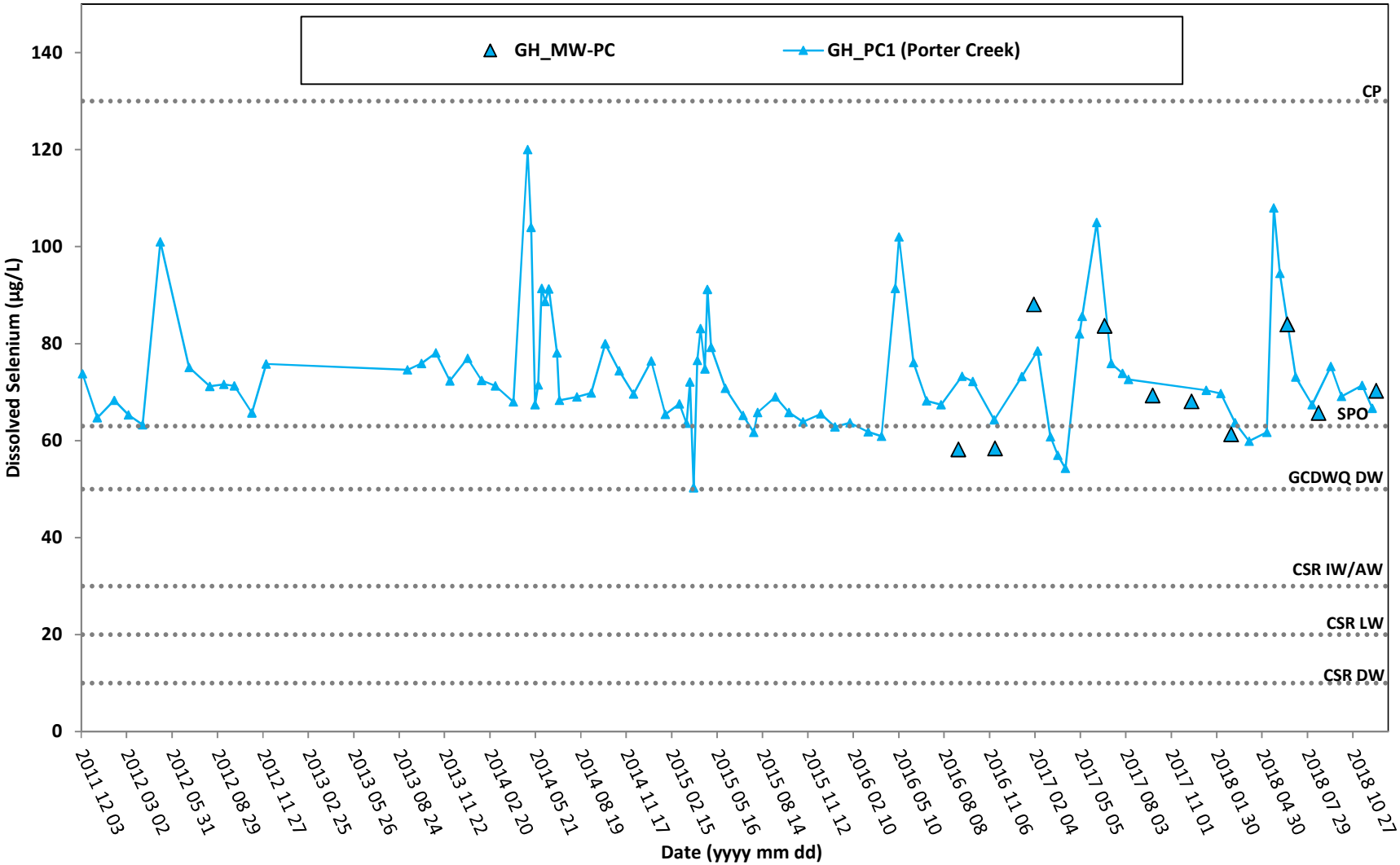


Graph 1-2 (1): Selenium Concentrations in Study Area 1



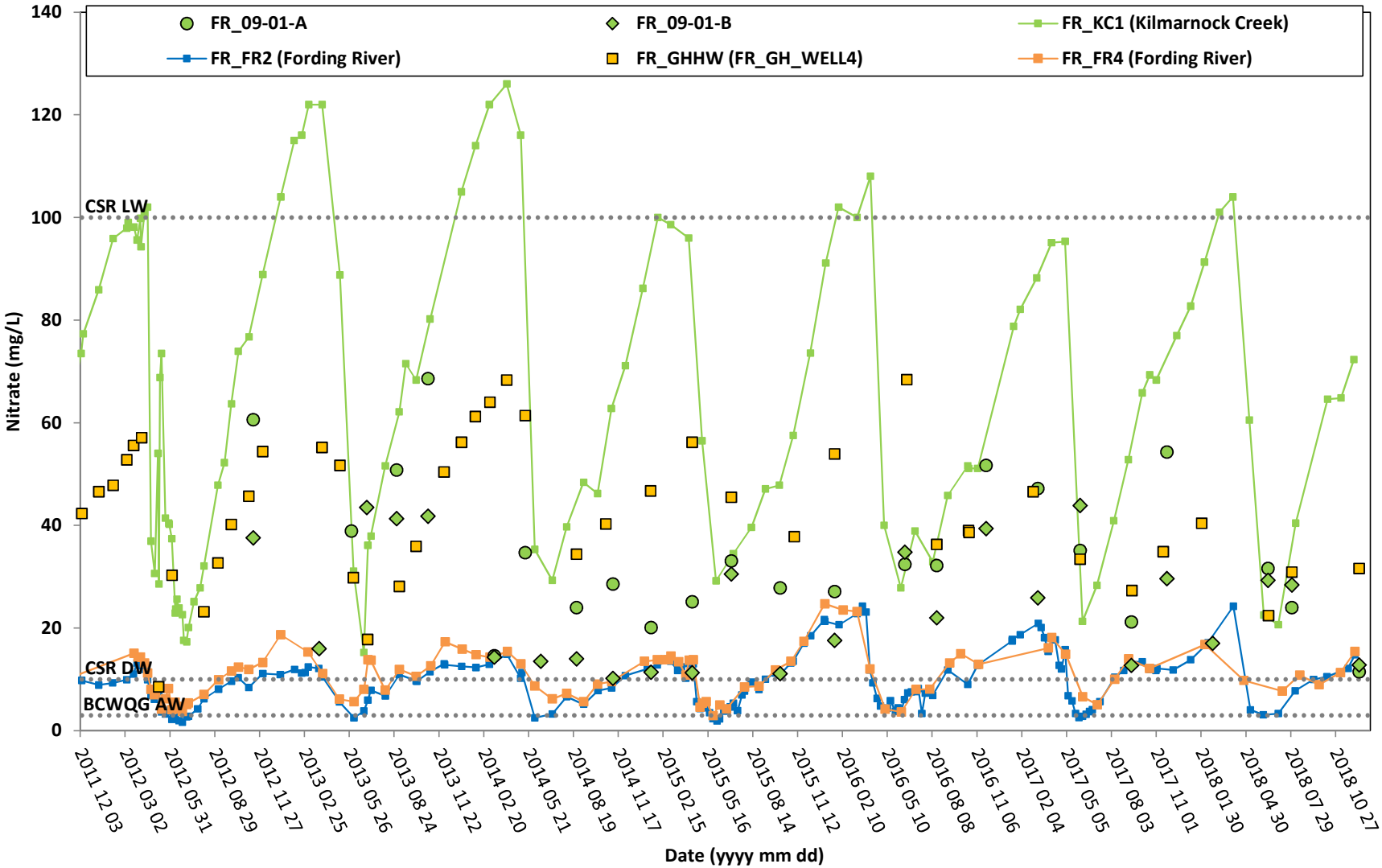
Note: FR_GHHW encompasses FR_GH_WELL1 through 4. As of Q4 2017, only FR_GH_WELL4 is sampled.

Graph 1-2 (2): Selenium Concentrations in Study Area 1



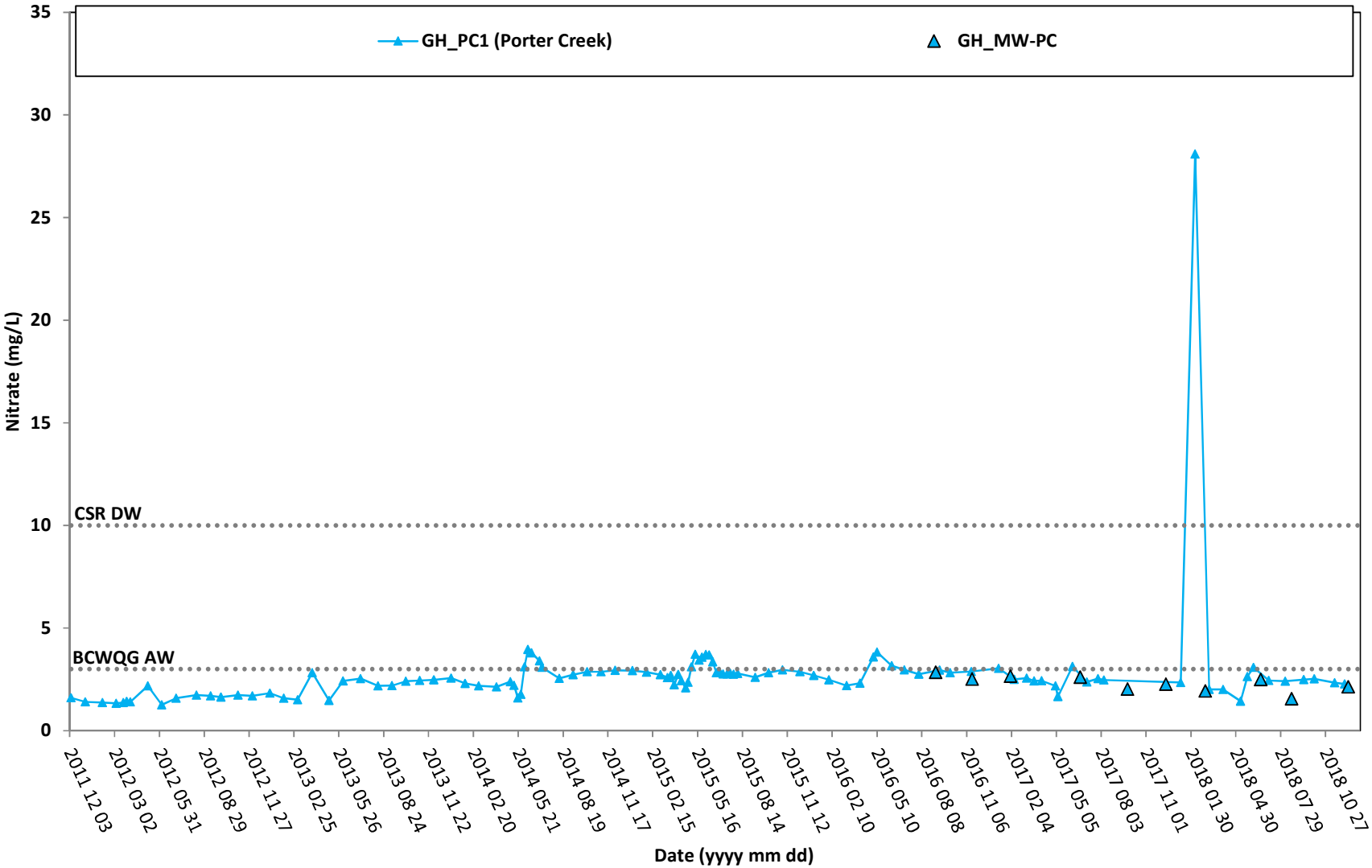
Note: FR_GHHW encompasses FR_GH_WELL1 through 4. As of Q4 2017, only FR_GH_WELL4 is sampled.

Graph 1-3 (1): Nitrate Concentrations in Study Area 1



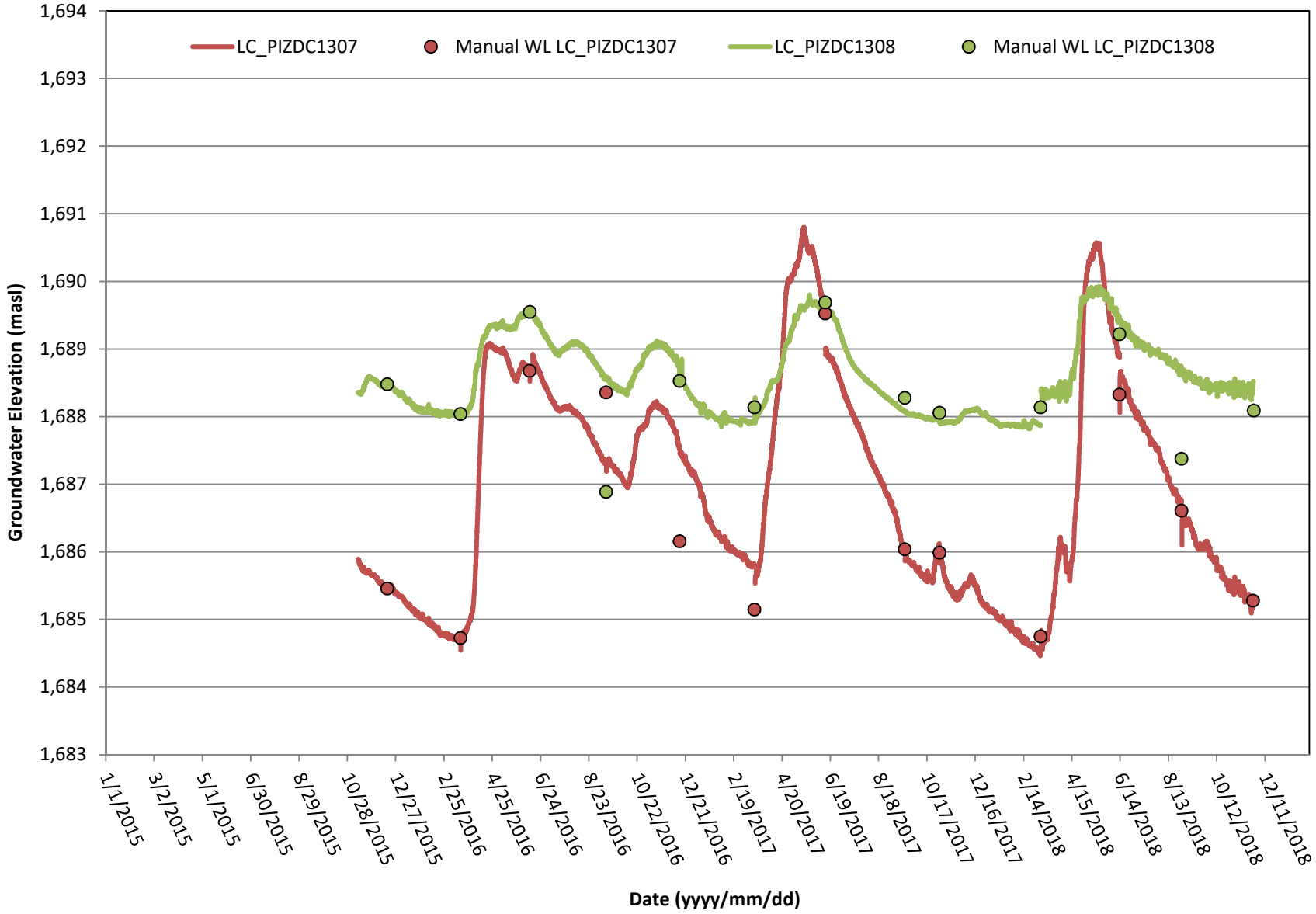
Note: FR_GHHW encompasses FR_GH_WELL1 through 4. As of Q4 2017, only FR_GH_WELL4 is sampled.

Graph 1-3 (2): Nitrate Concentrations in Study Area 1



Note: FR_GHHW encompasses FR_GH_WELL1 through 4. As of Q4 2017, only FR_GH_WELL4 is sampled.

Graph 2-1: Groundwater Elevation in Study Area 2 Wells



Graph 2-2: Selenium Concentrations in Study Area 2

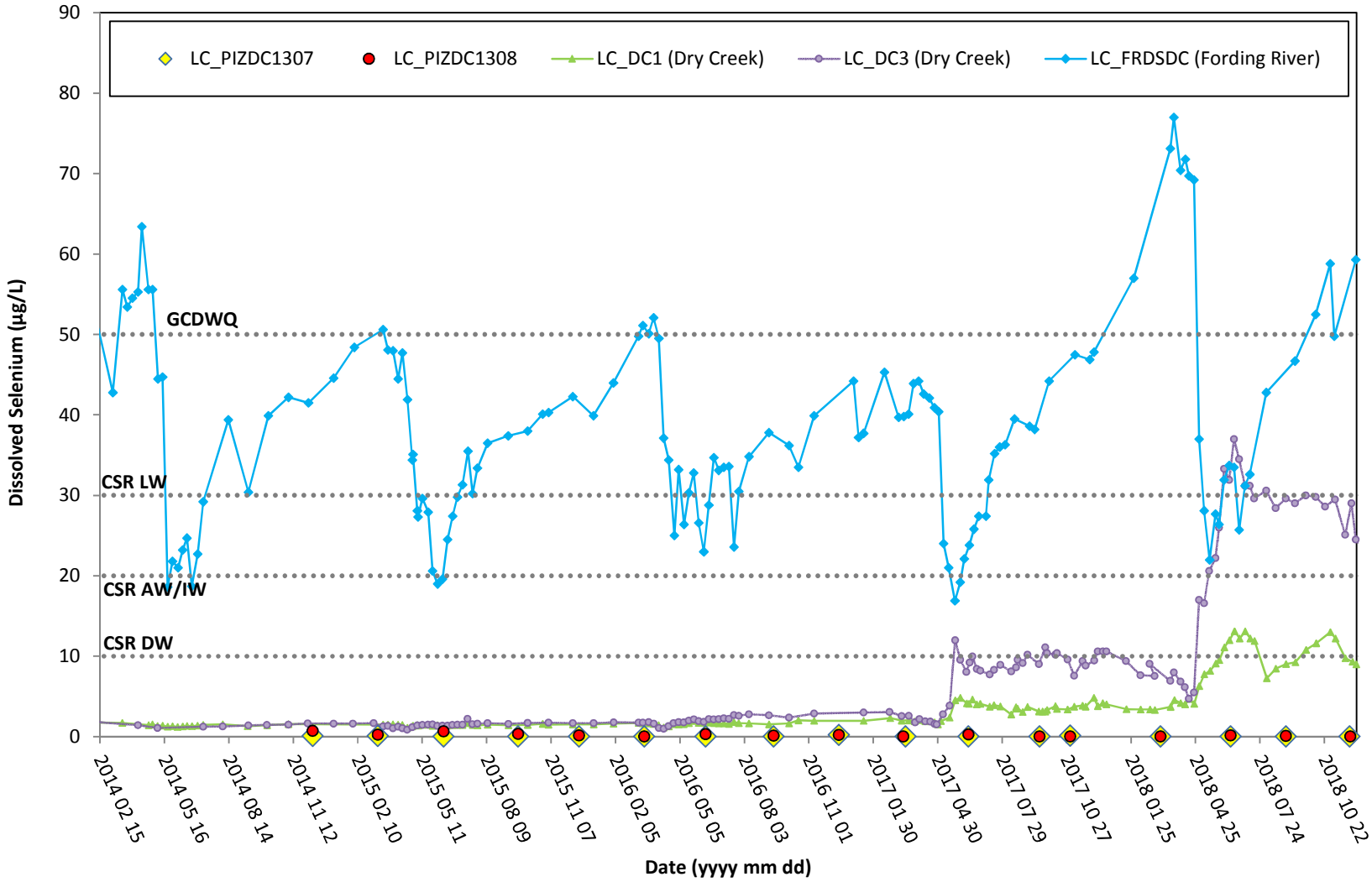
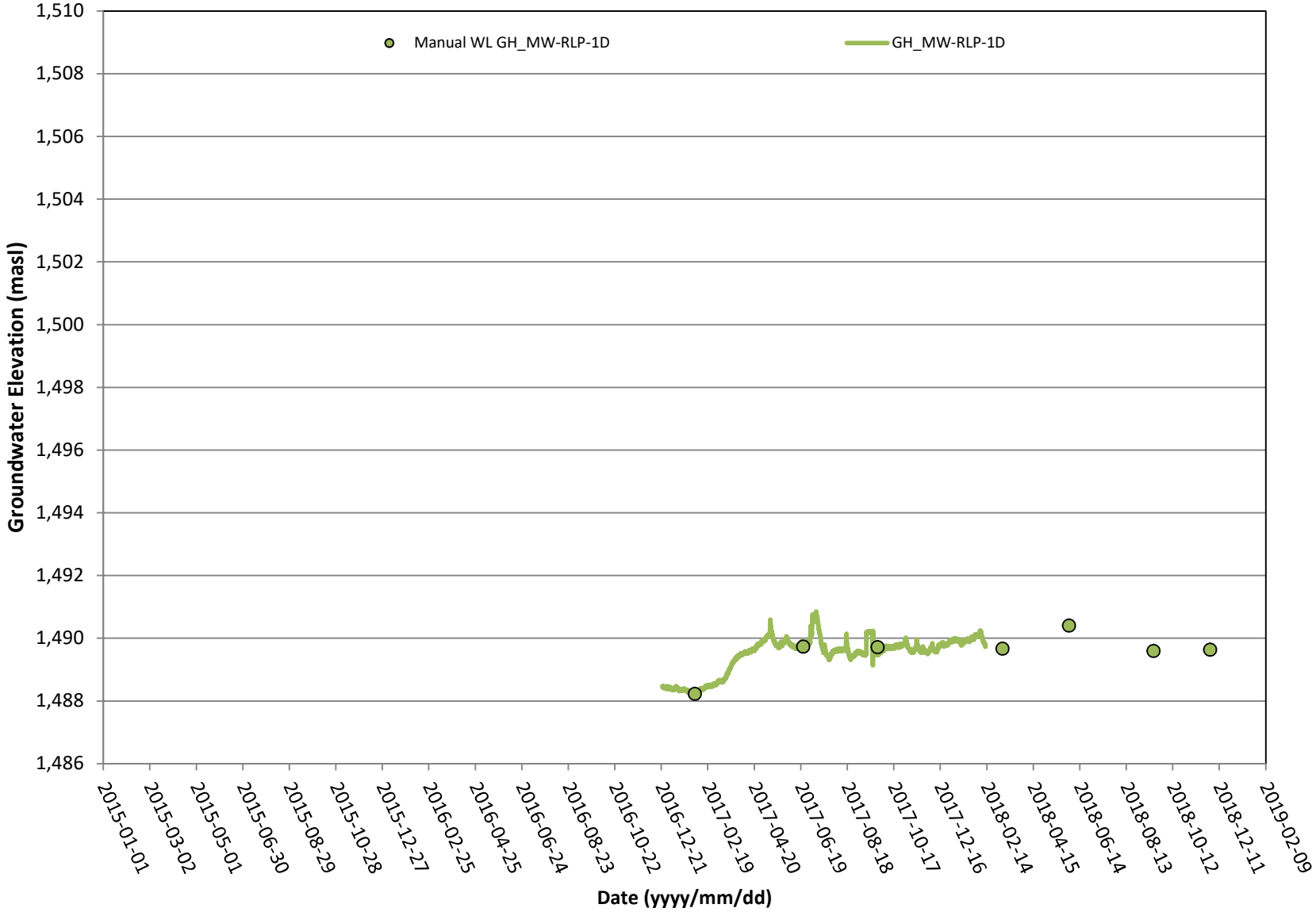
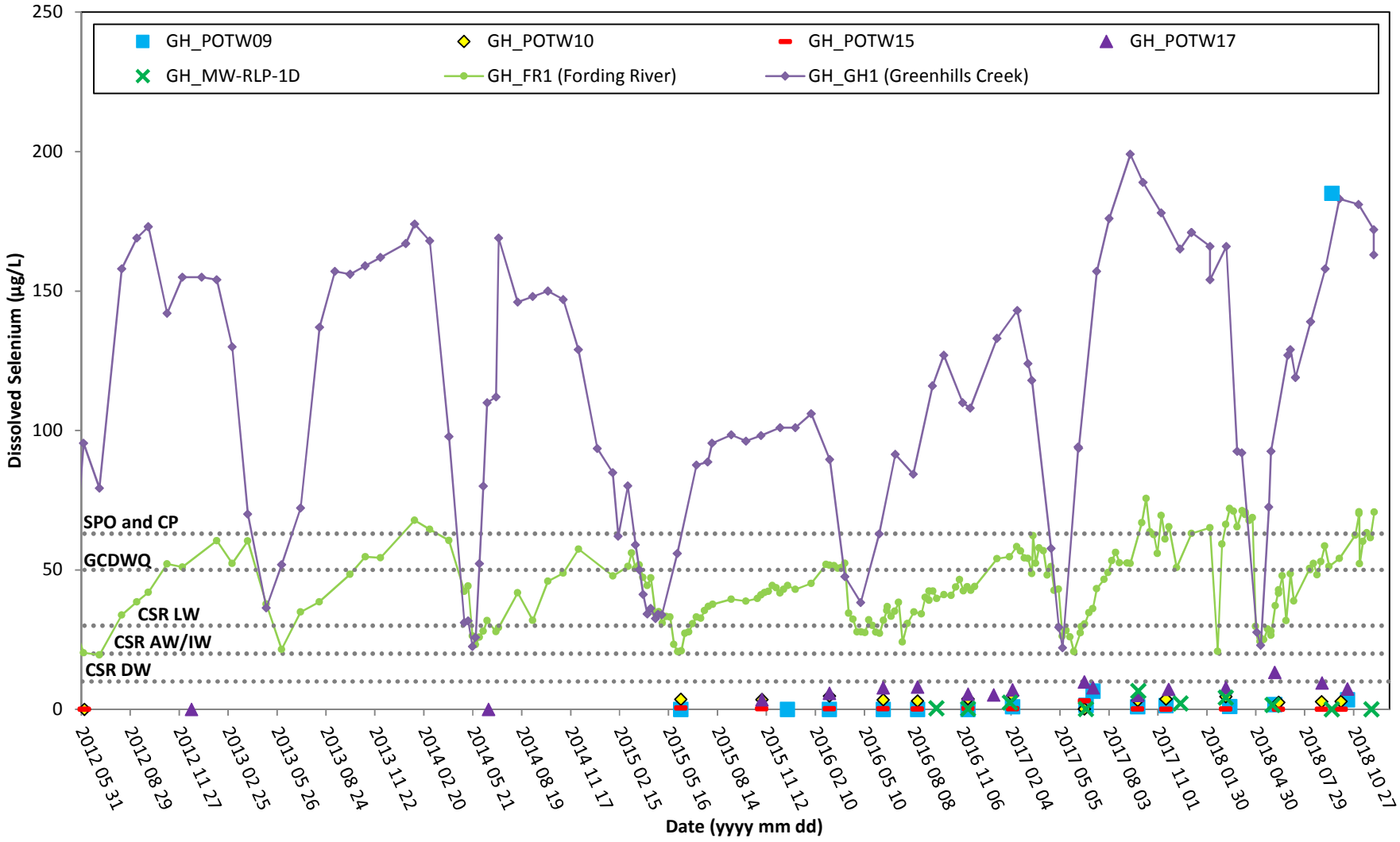


Figure 3-1: Groundwater Elevation of Study Area 3



Graph 3-2: Selenium Concentrations in Study Area 3



Note: Total metals concentrations were used for GH_FR1 and GH_GH1 if dissolved concentrations were not available.

Graph 3-3: Sulphate Concentrations in Study Area 3

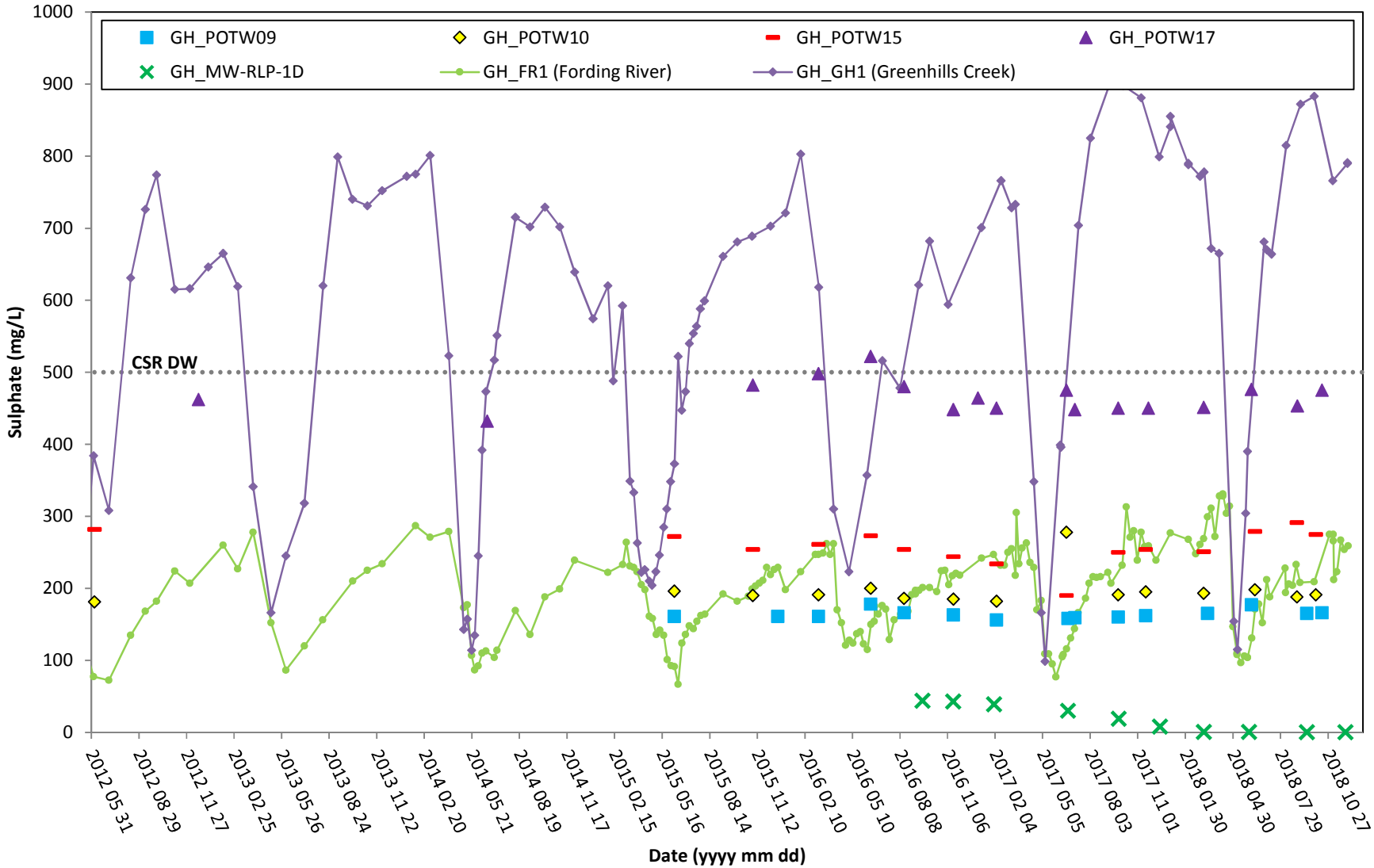
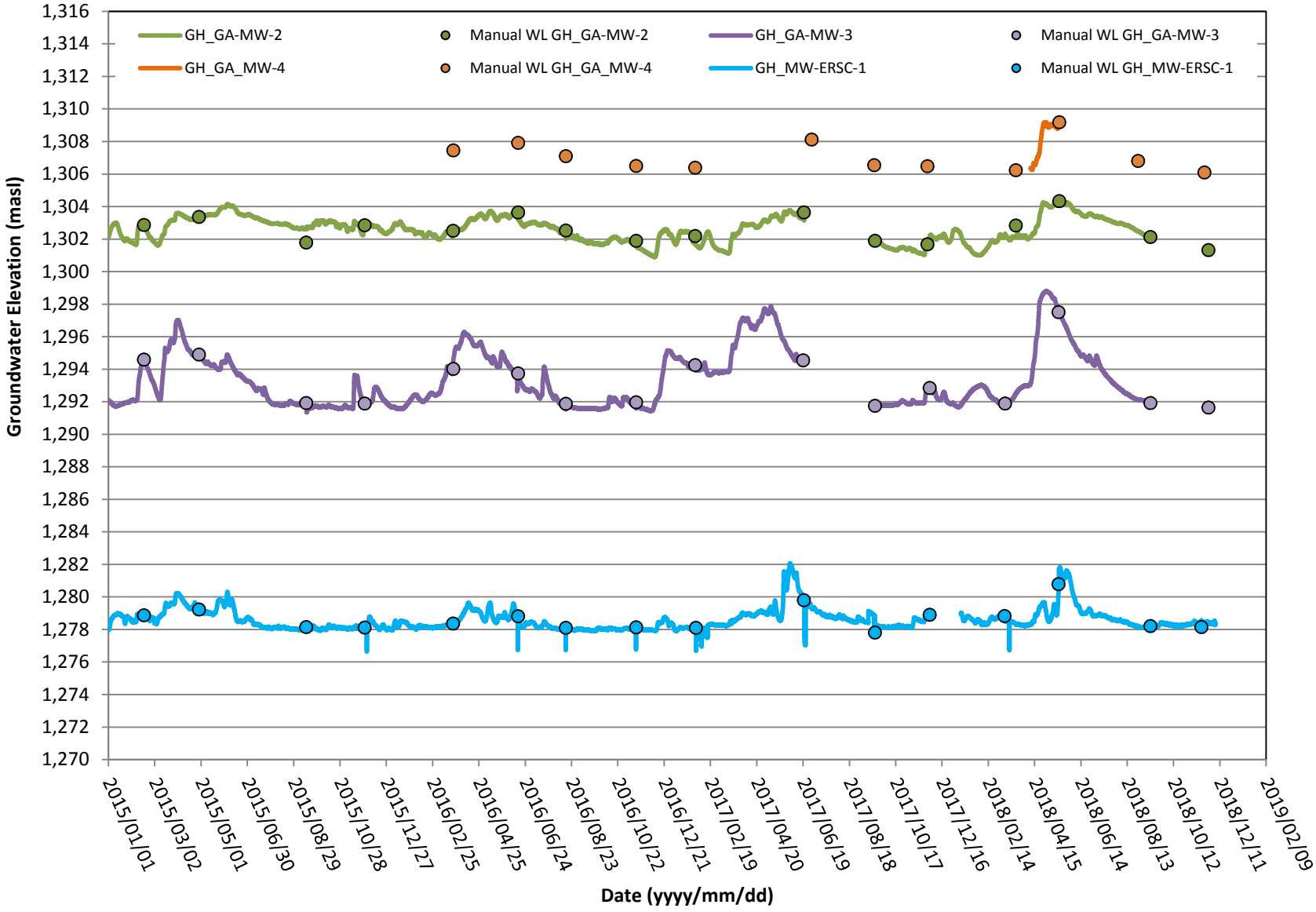
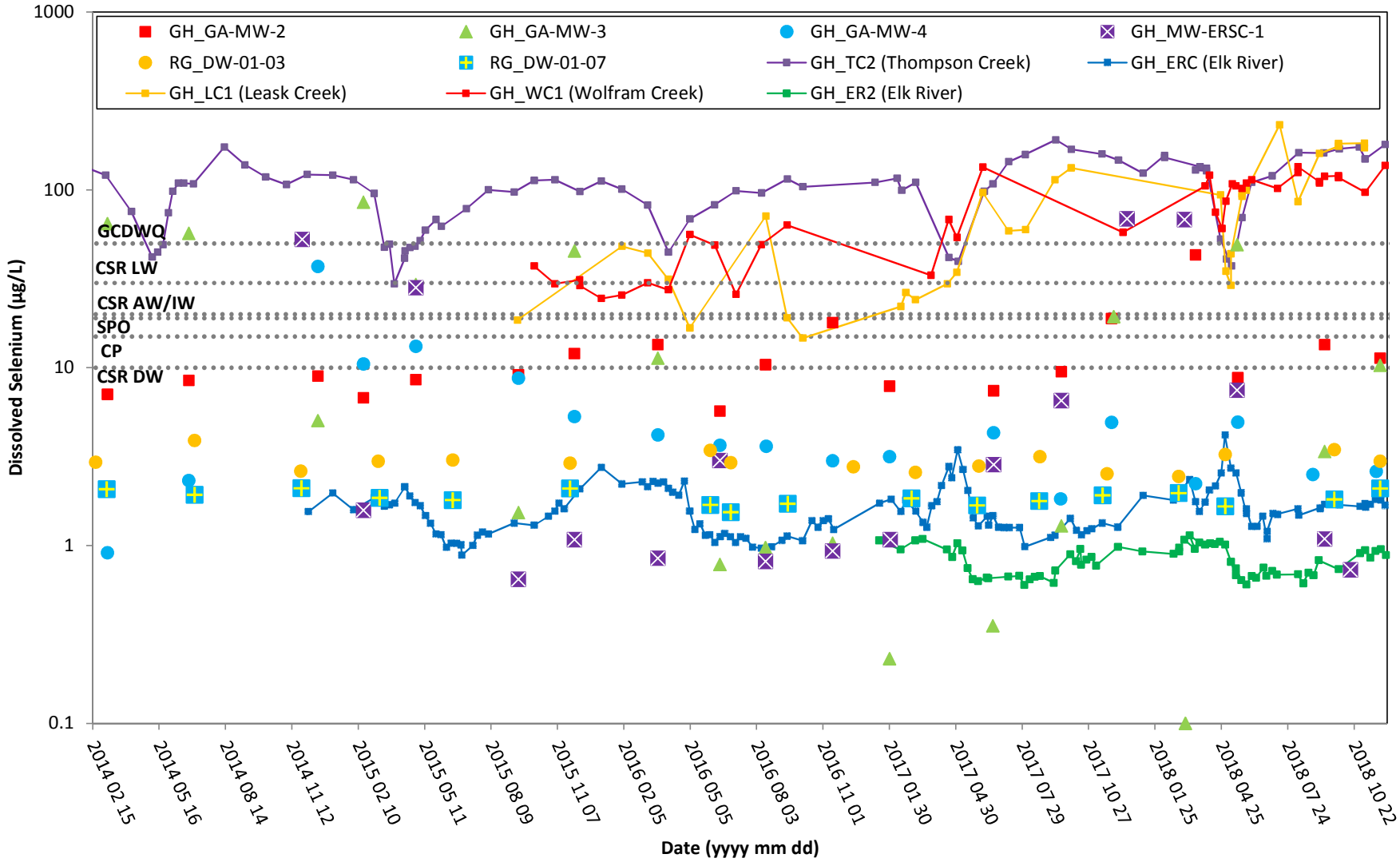


Figure 4-1: Groundwater Elevation in Study Area 4 Wells

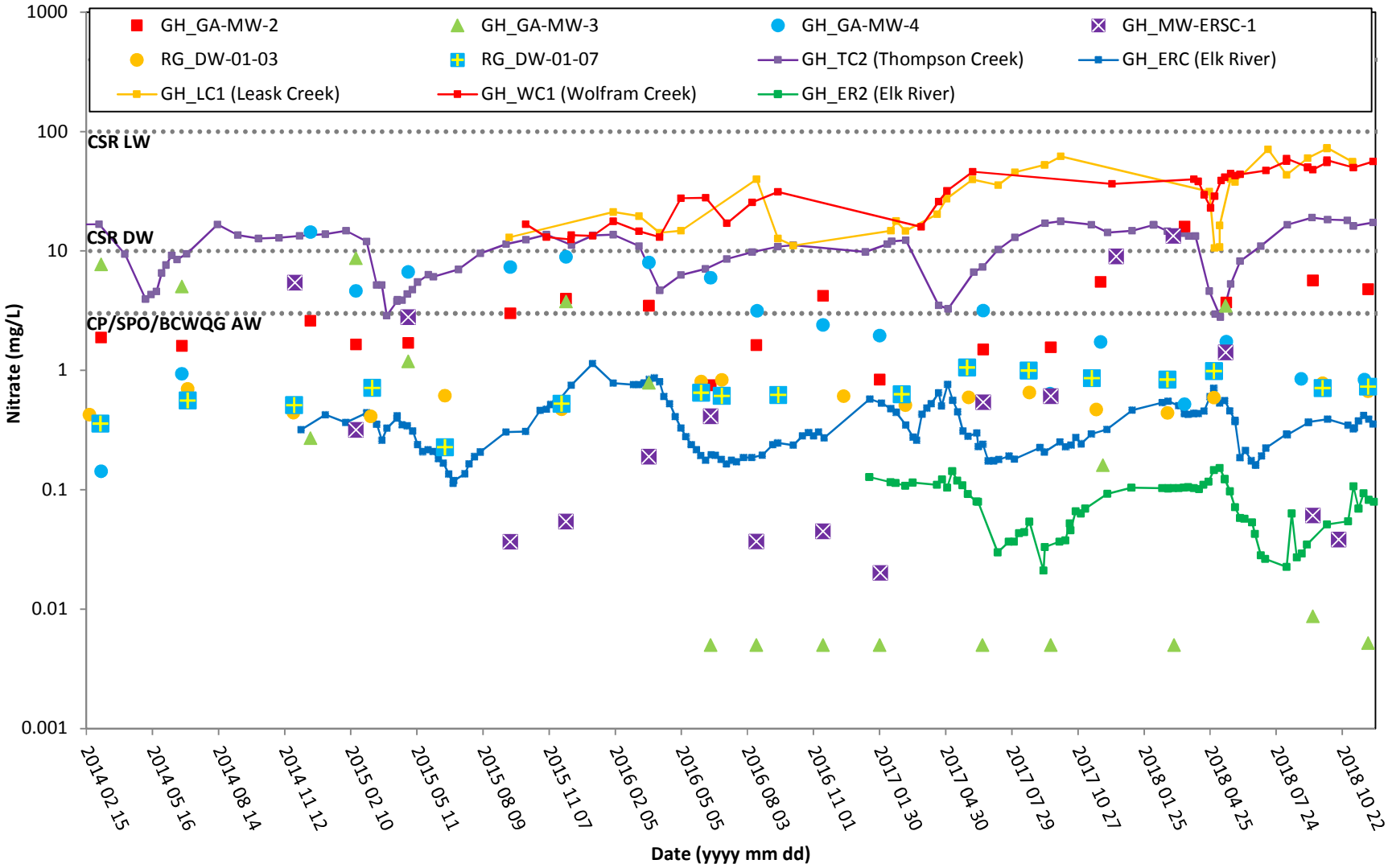


Note: data was removed where suspected datalogger removal occured.

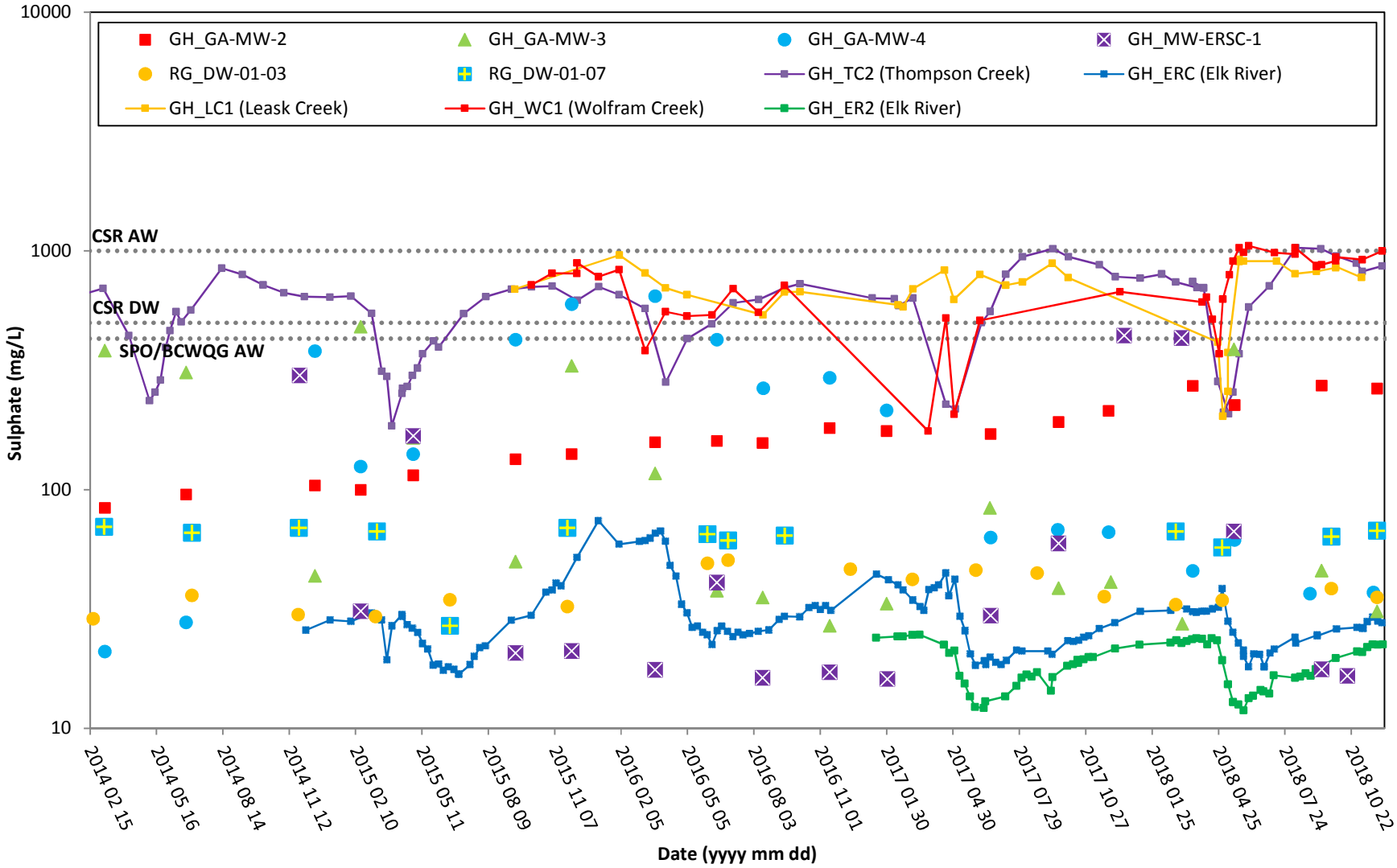
Graph 4-2: Selenium Concentrations in Study Area 4



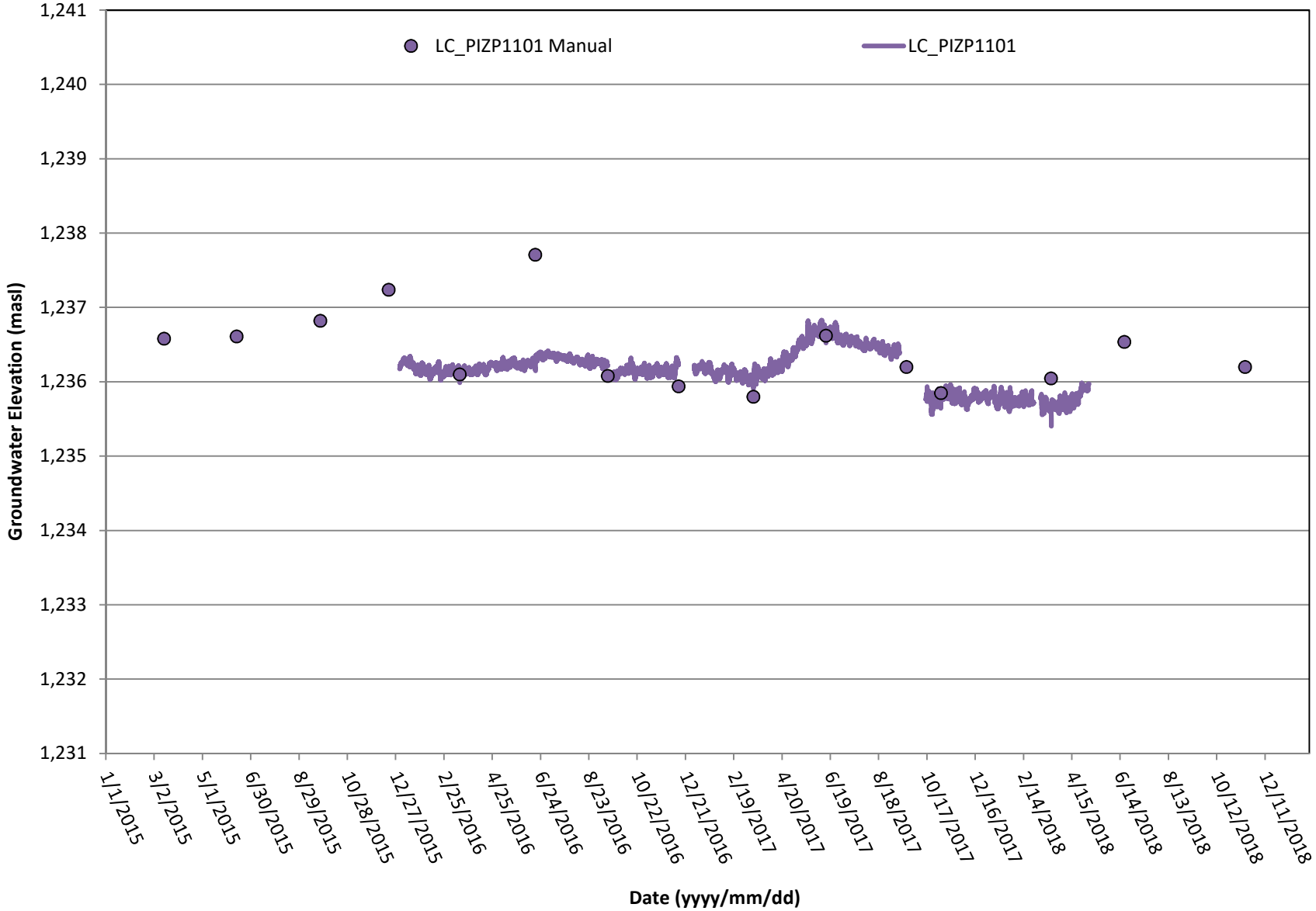
Graph 4-3: Nitrate Concentrations in Study Area 4



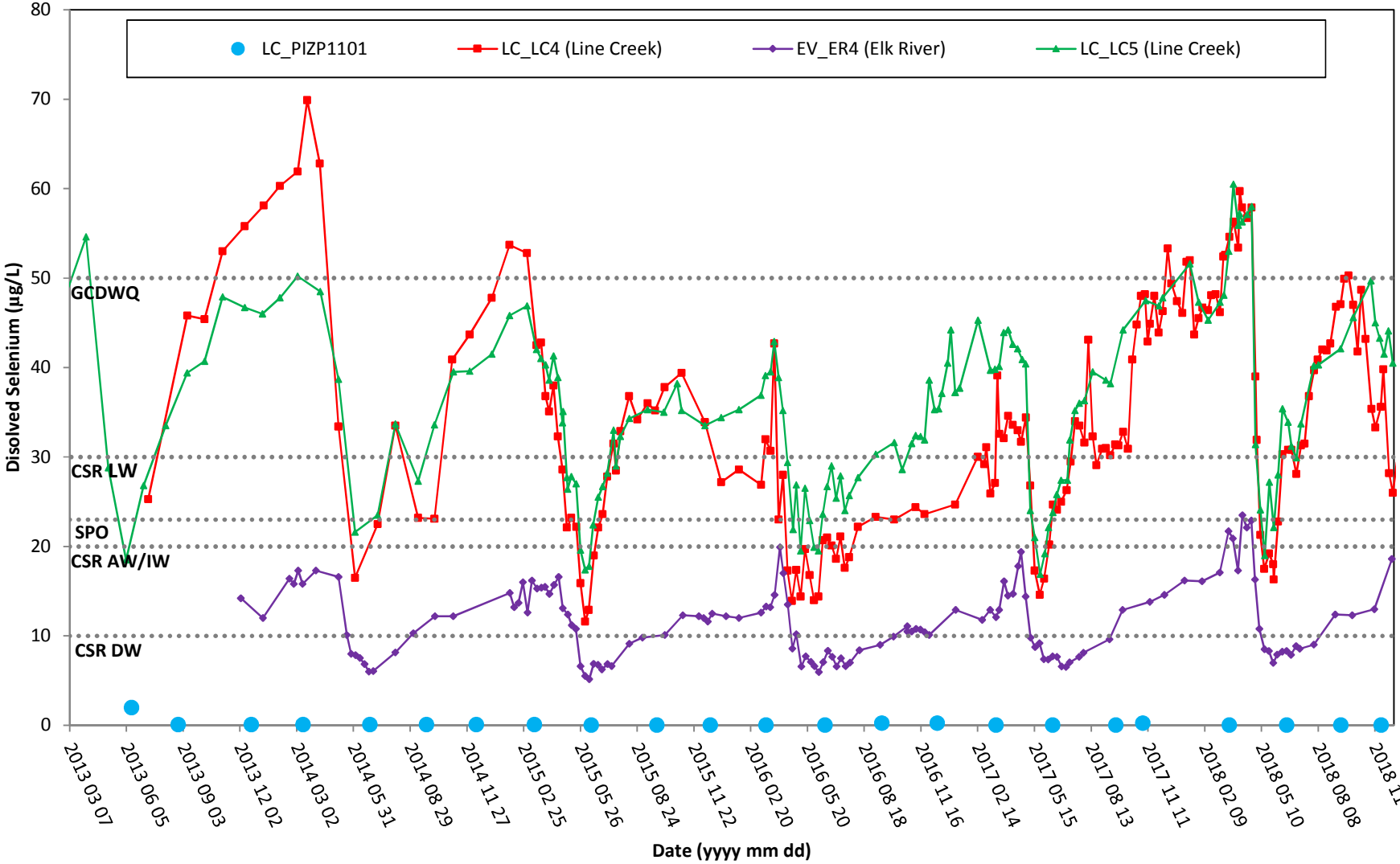
Graph 4-4: Sulphate Concentrations in Study Area 4



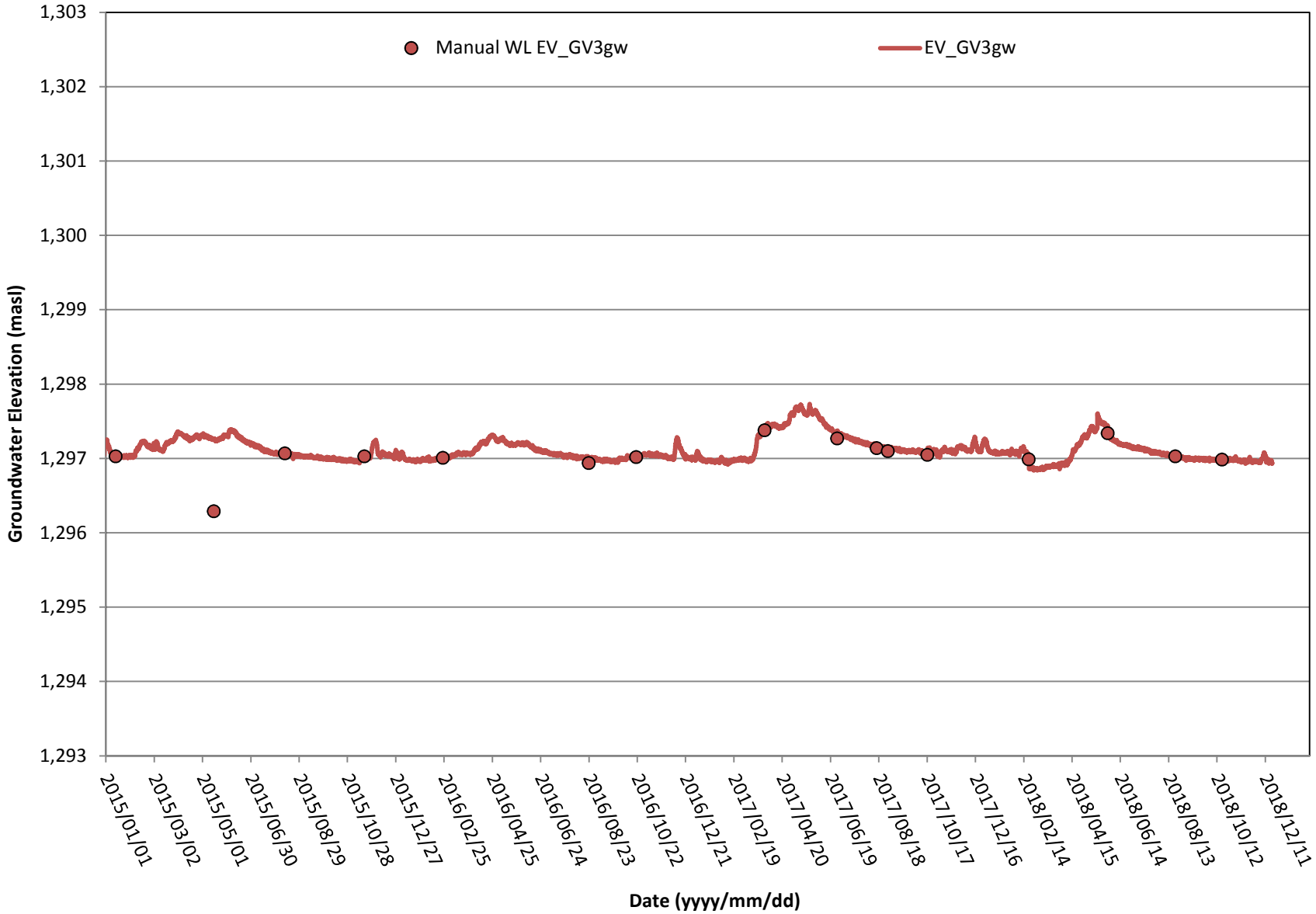
Graph 6-1: Groundwater Elevation in Study Area 6 Well



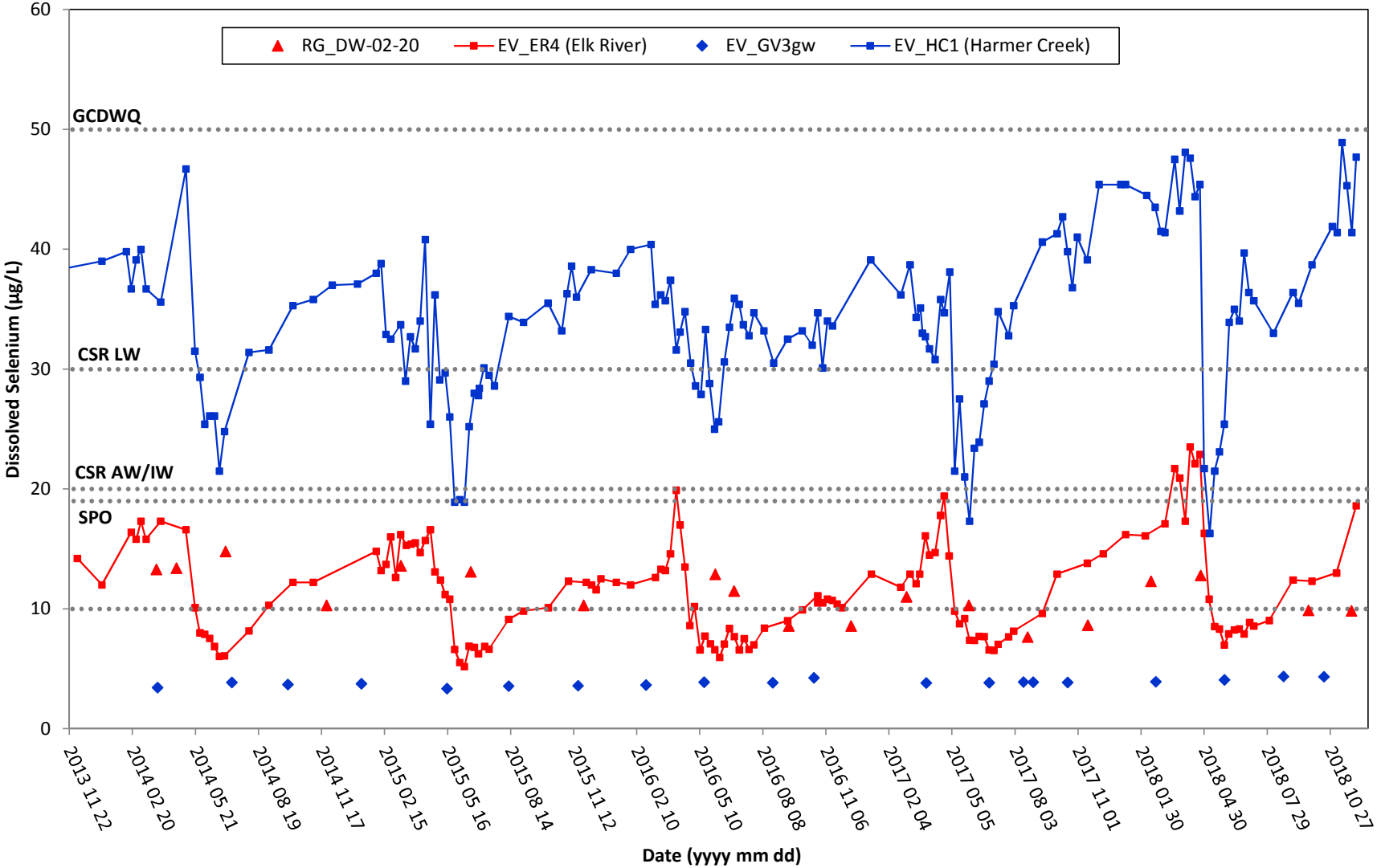
Graph 6-2: Selenium Concentrations in Study Area 6



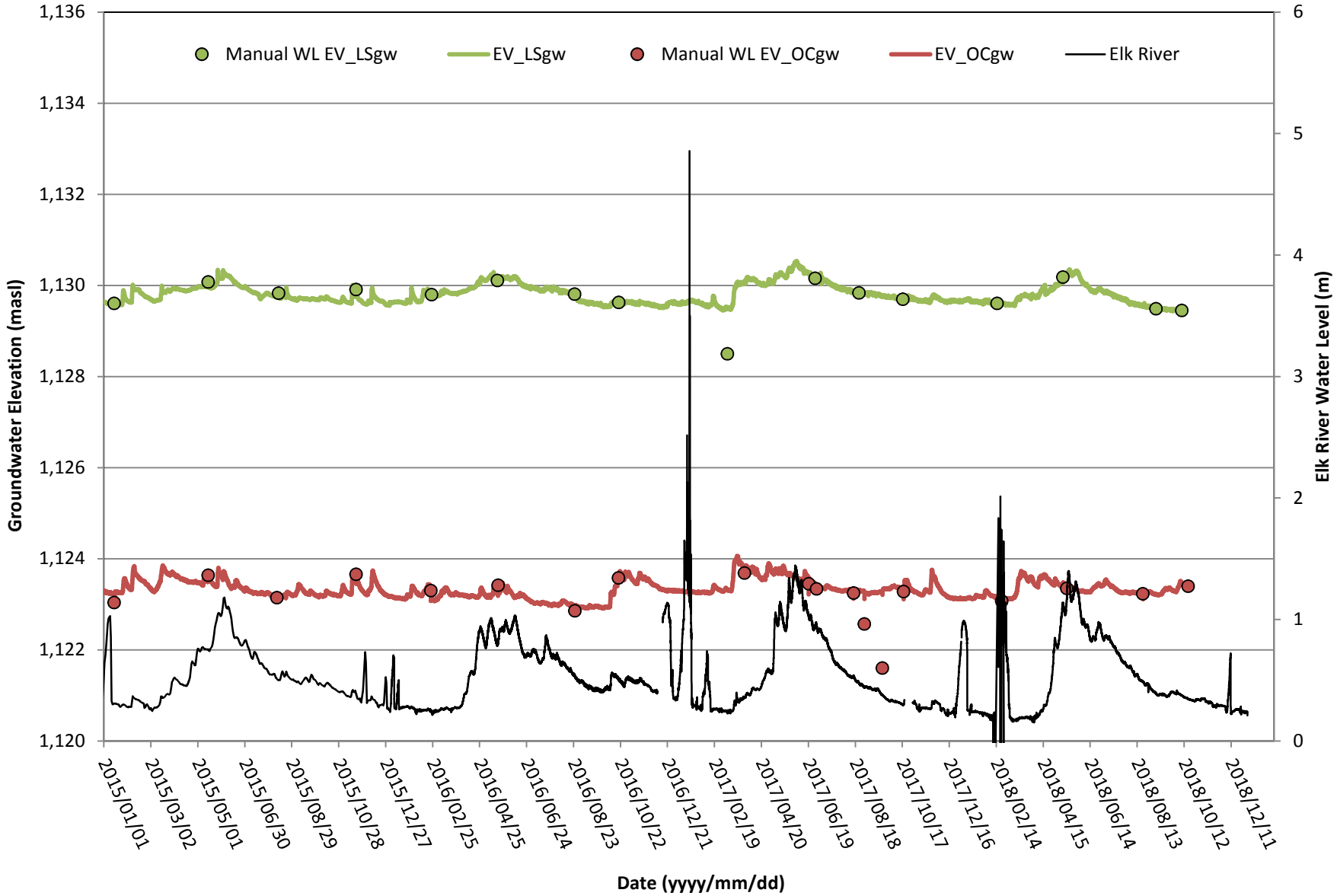
Graph 7-1: Groundwater Elevation in Study Area 7 Well



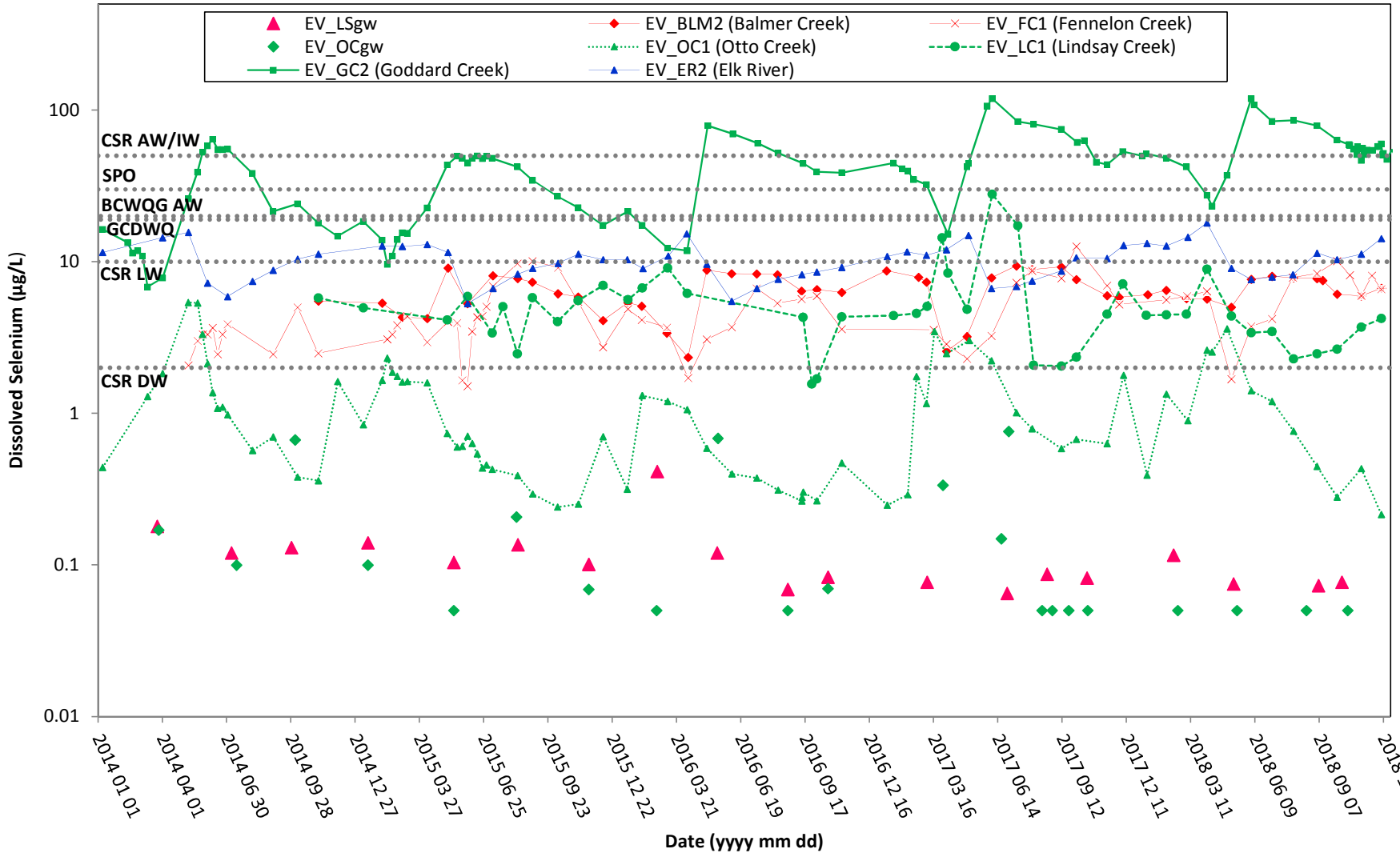
Graph 7-2: Selenium Concentrations in Study Area 7



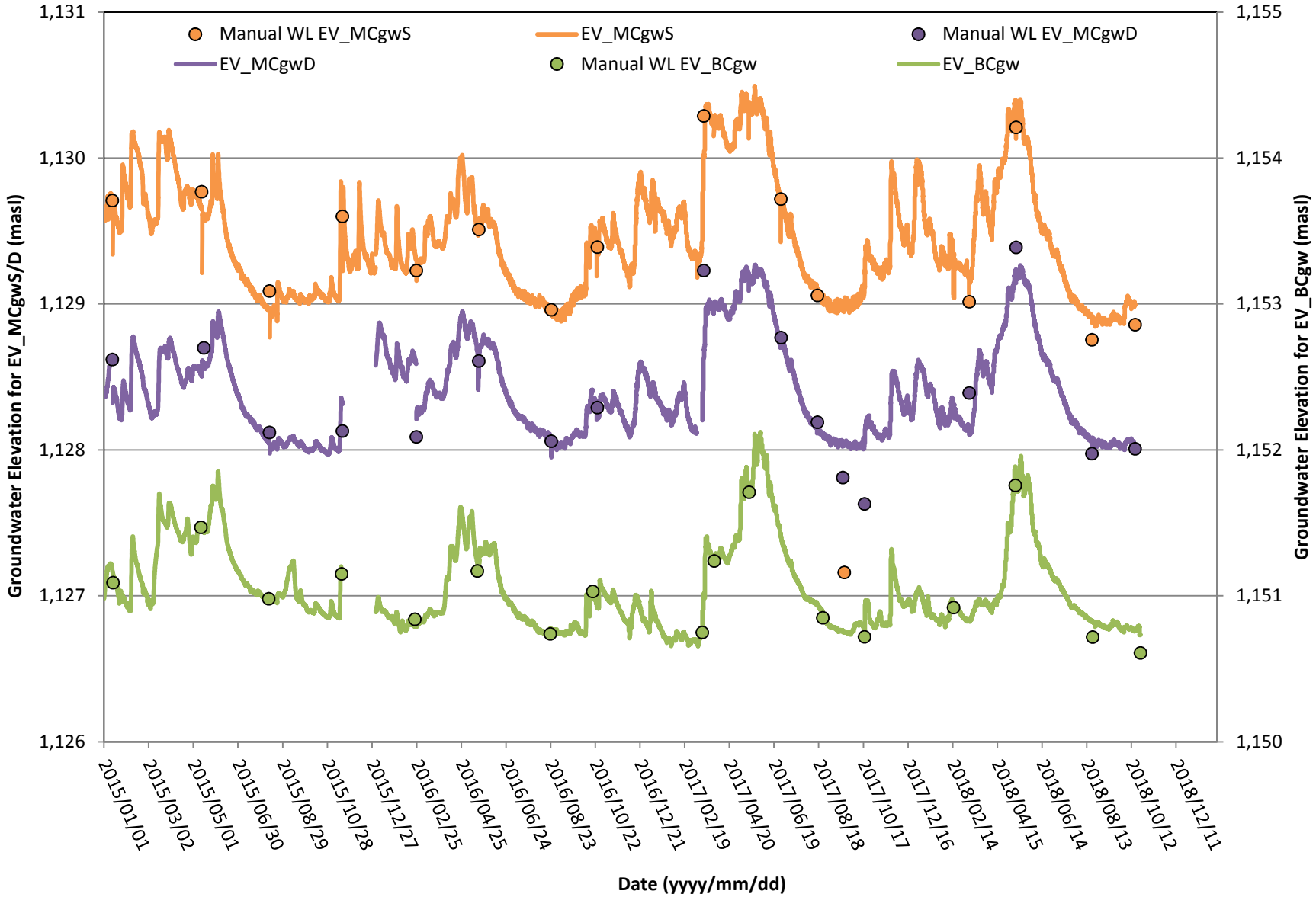
Graph 8-1: Groundwater Elevation in Study Area 8 Wells and Elk River Level



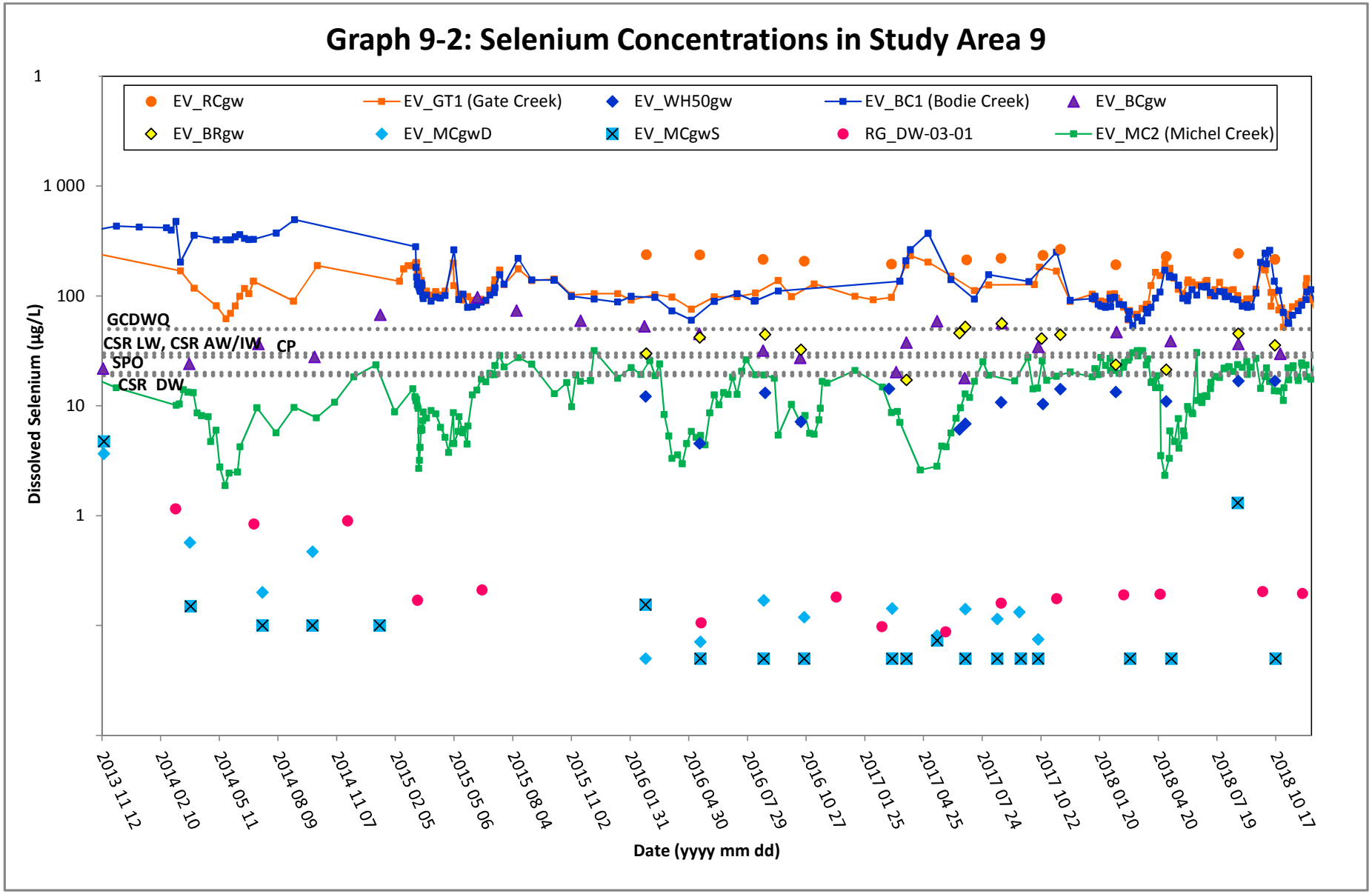
Graph 8-2: Selenium Concentrations in Study Area 8



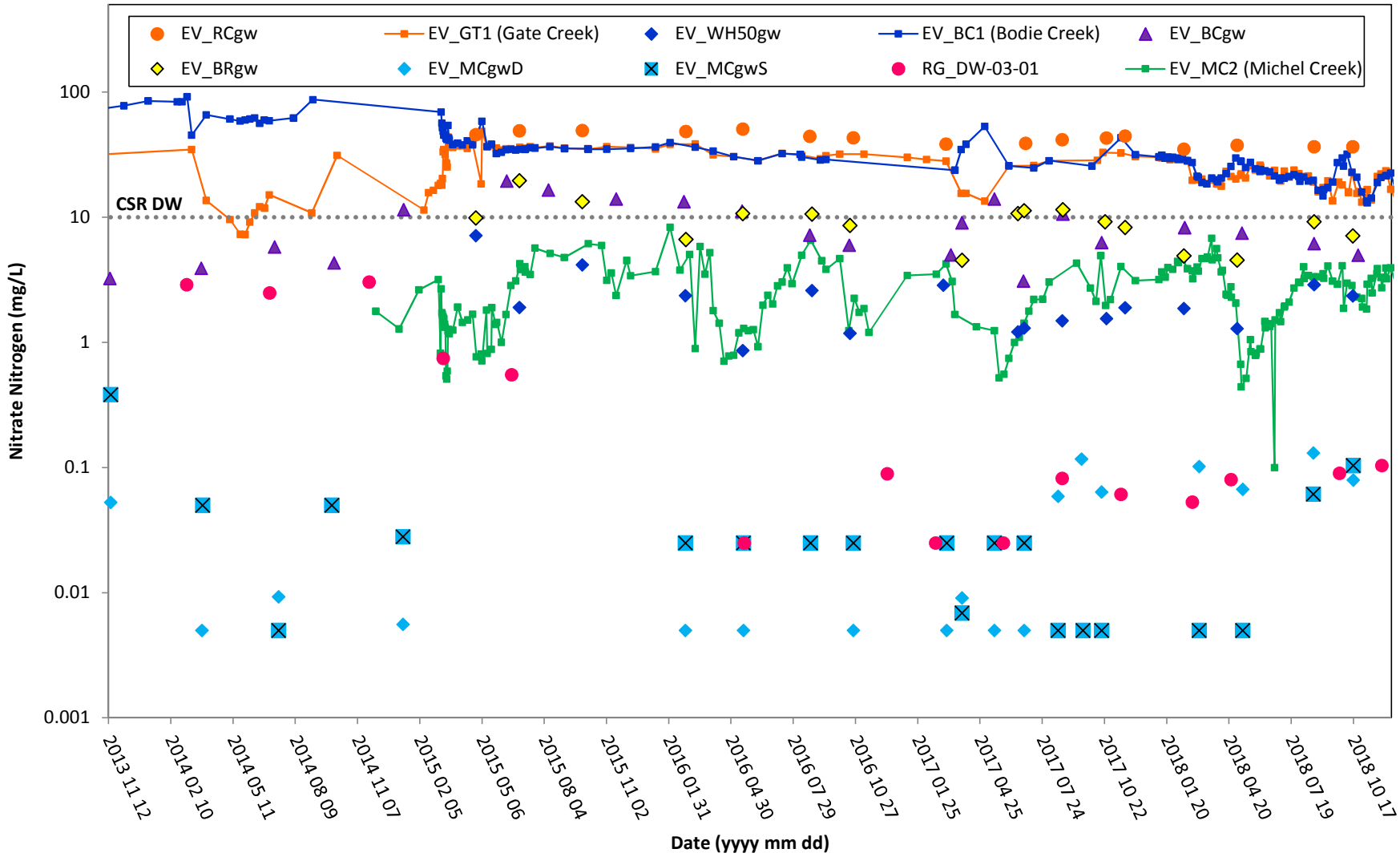
Graph 9-1: Groundwater Elevation in Study Area 9 Wells



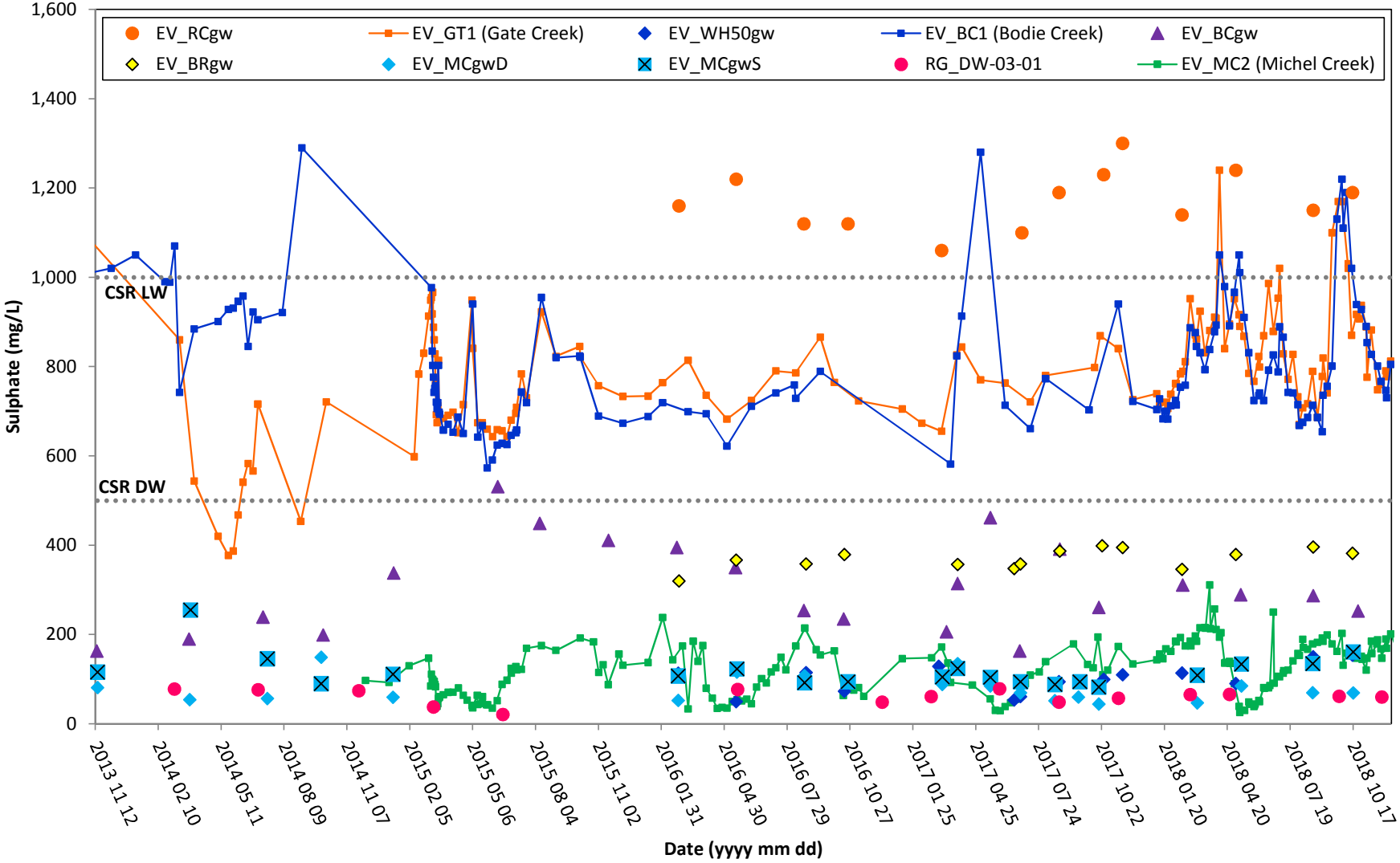
Graph 9-2: Selenium Concentrations in Study Area 9



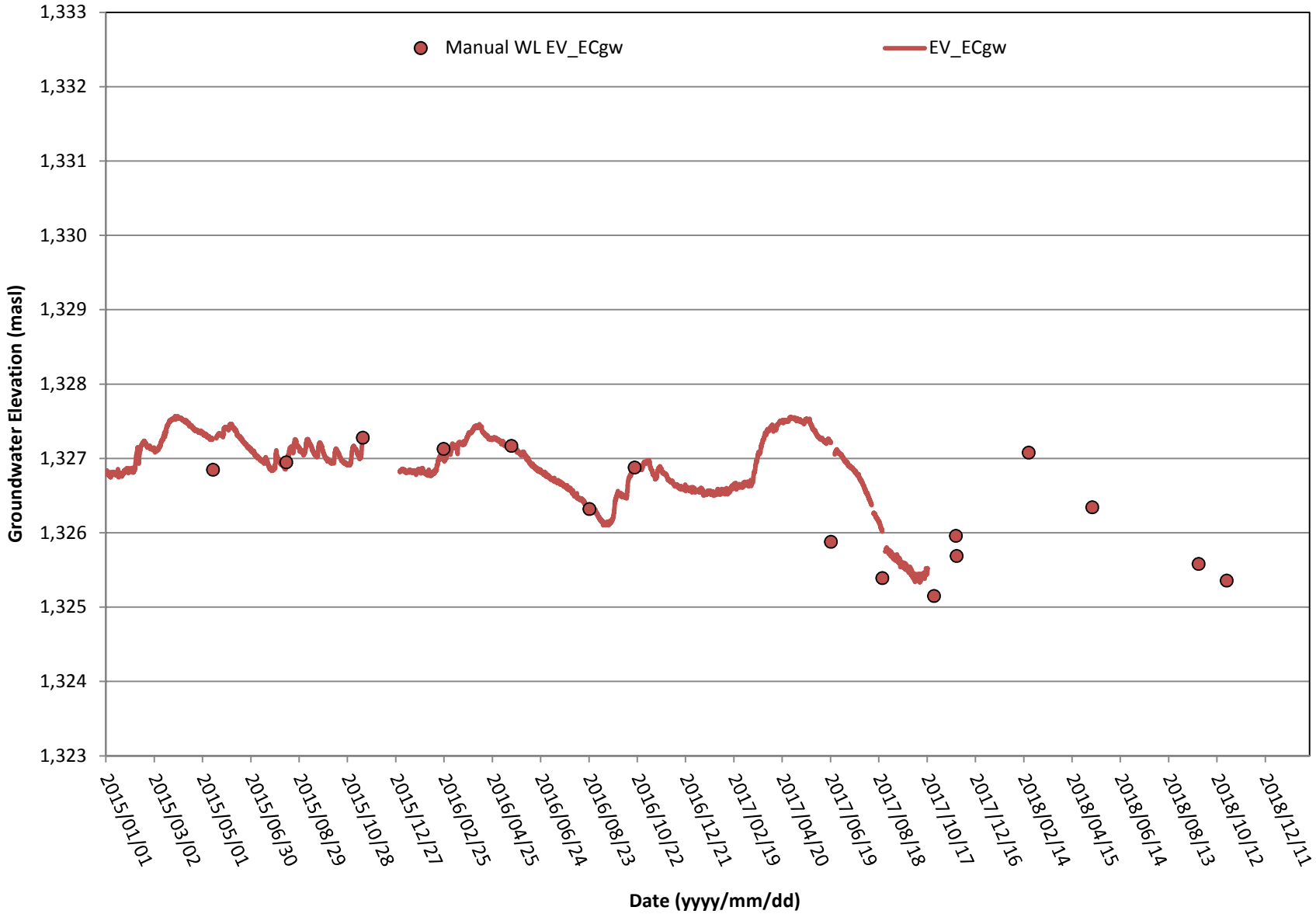
Graph 9-3: Nitrate Concentrations in Study Area 9



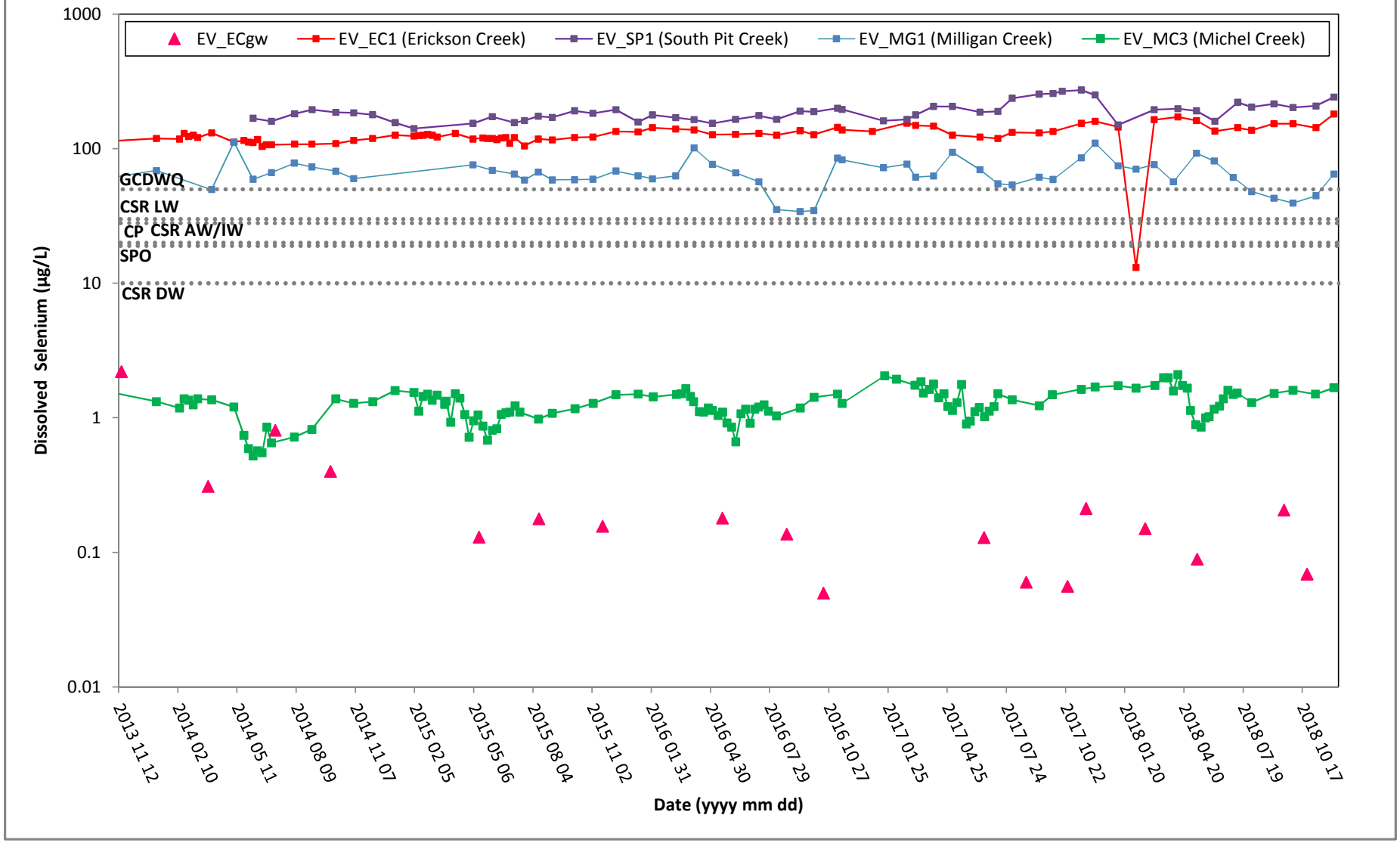
Graph 9-4: Sulphate Concentrations in Study Area 9



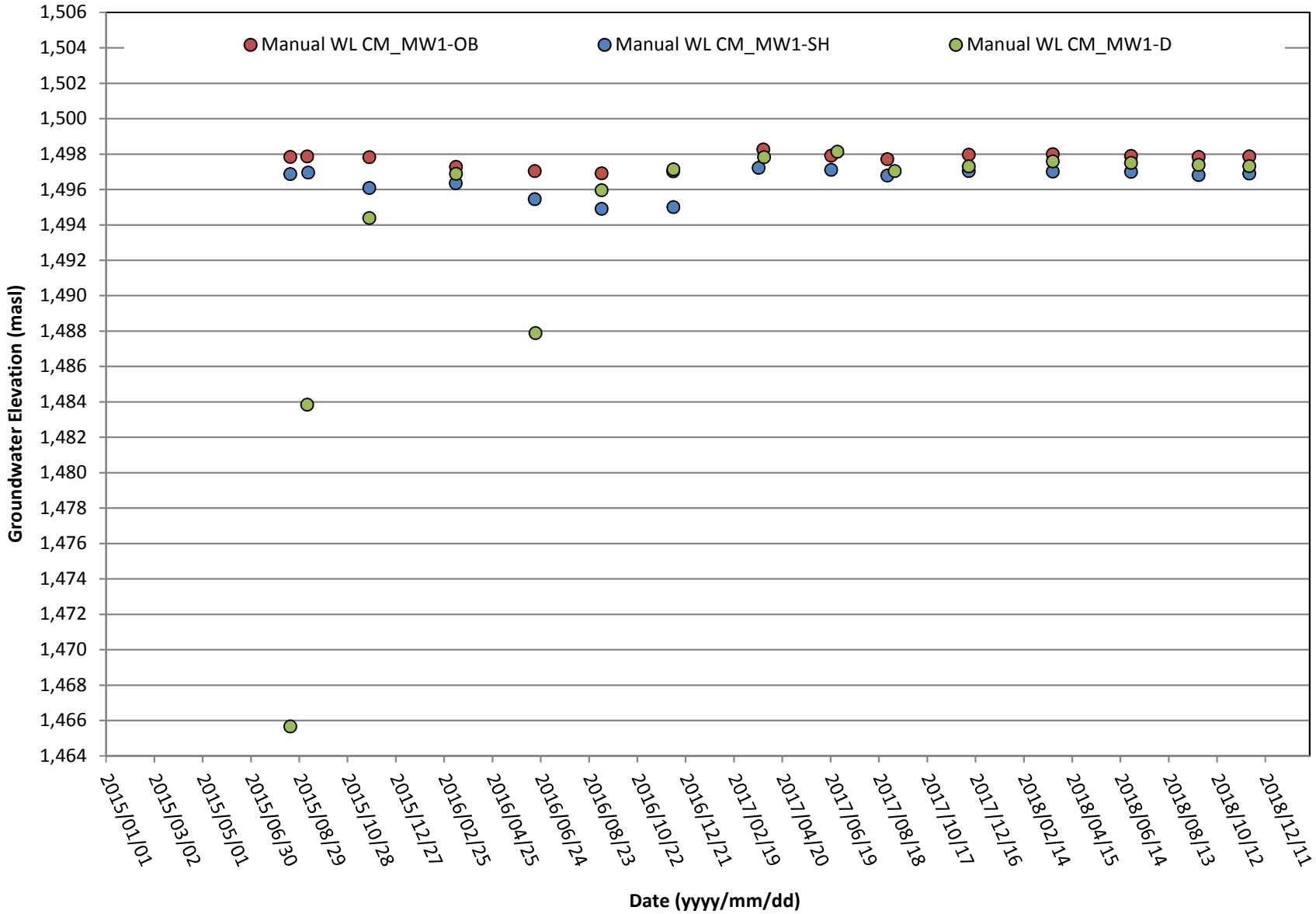
Graph 10-1: Groundwater Elevation in Study Area 10 Well



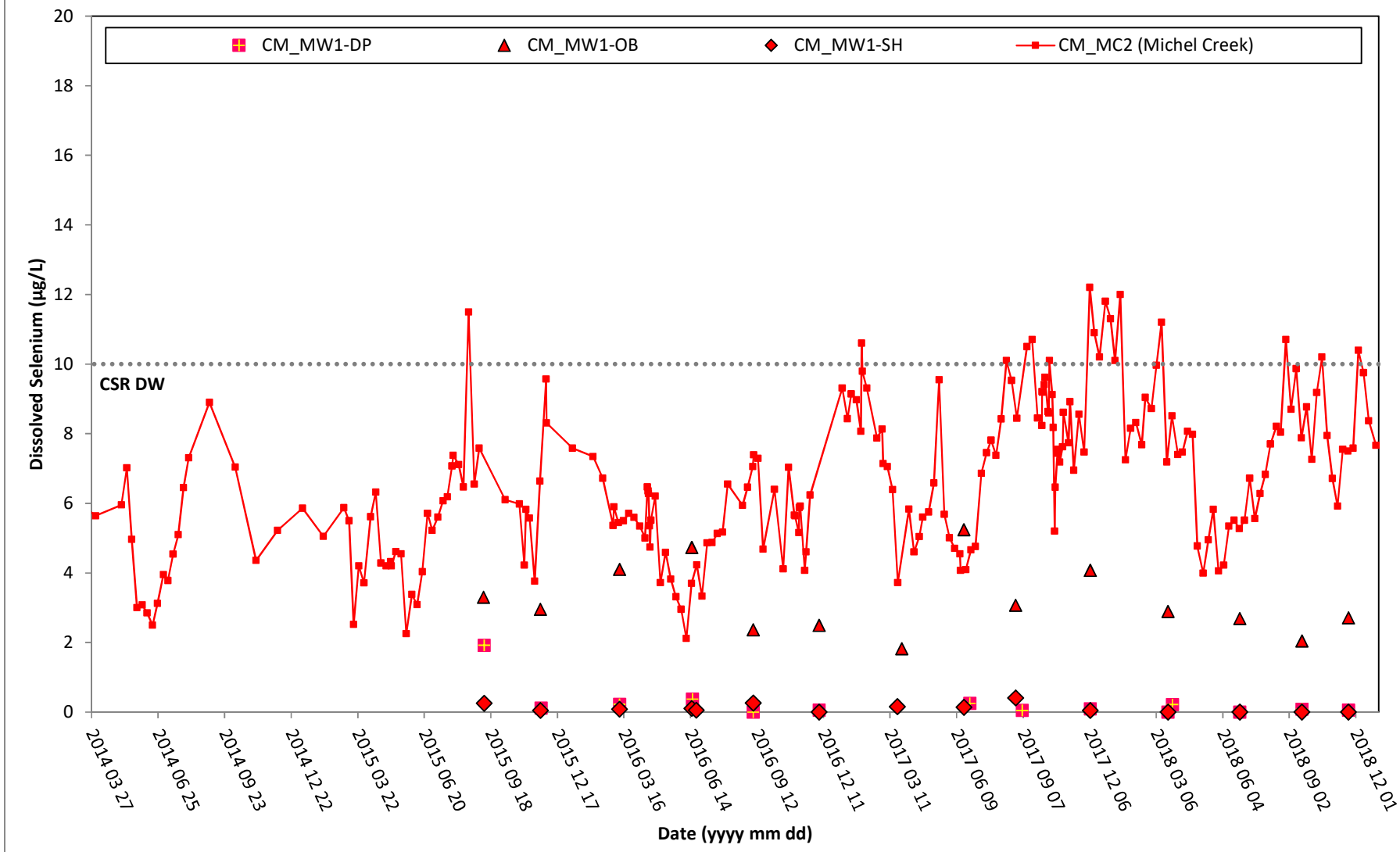
Graph 10-2: Selenium Concentrations in Study Area 10



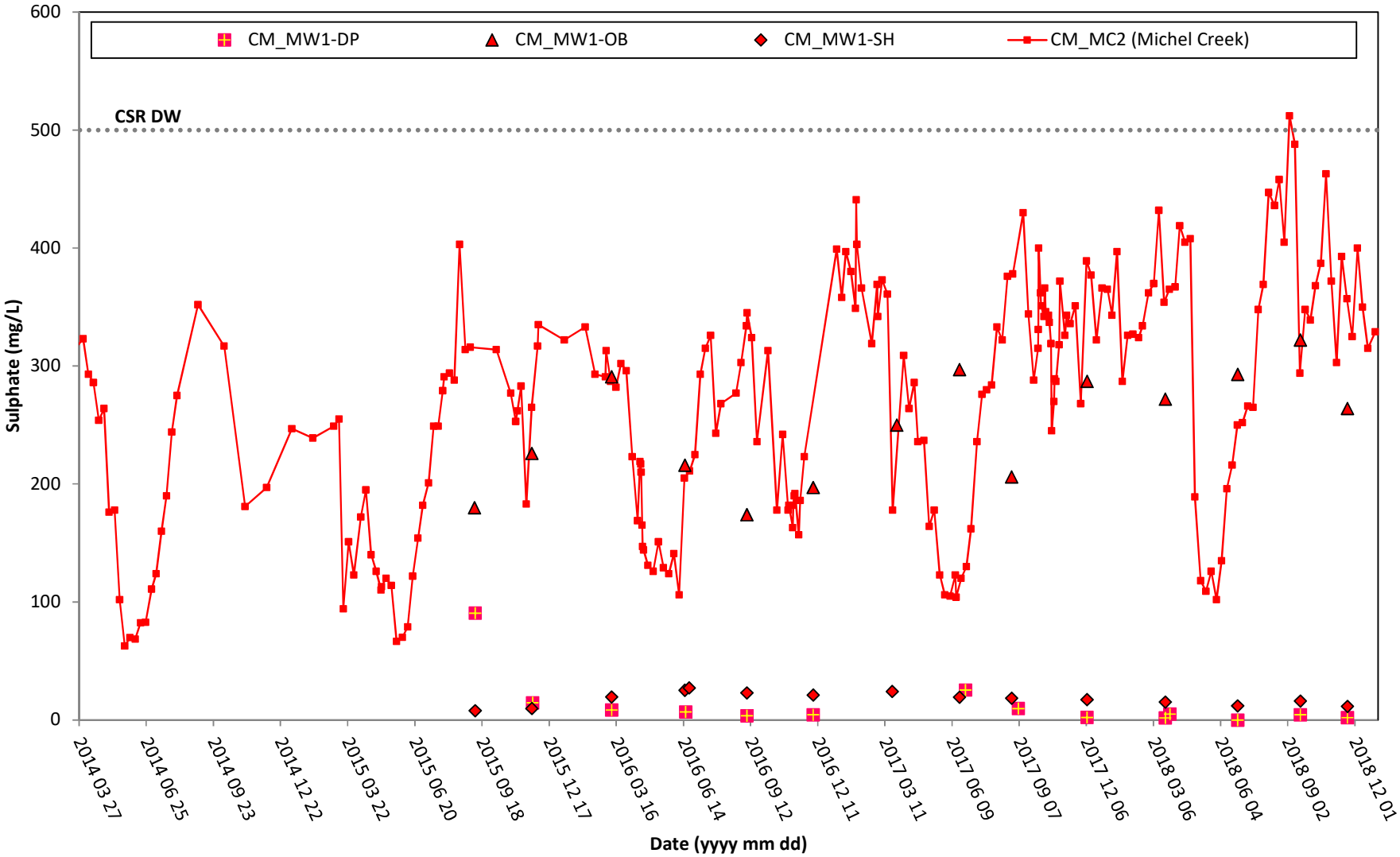
Graph 11-1: Groundwater Elevation in Study Area 11 Wells



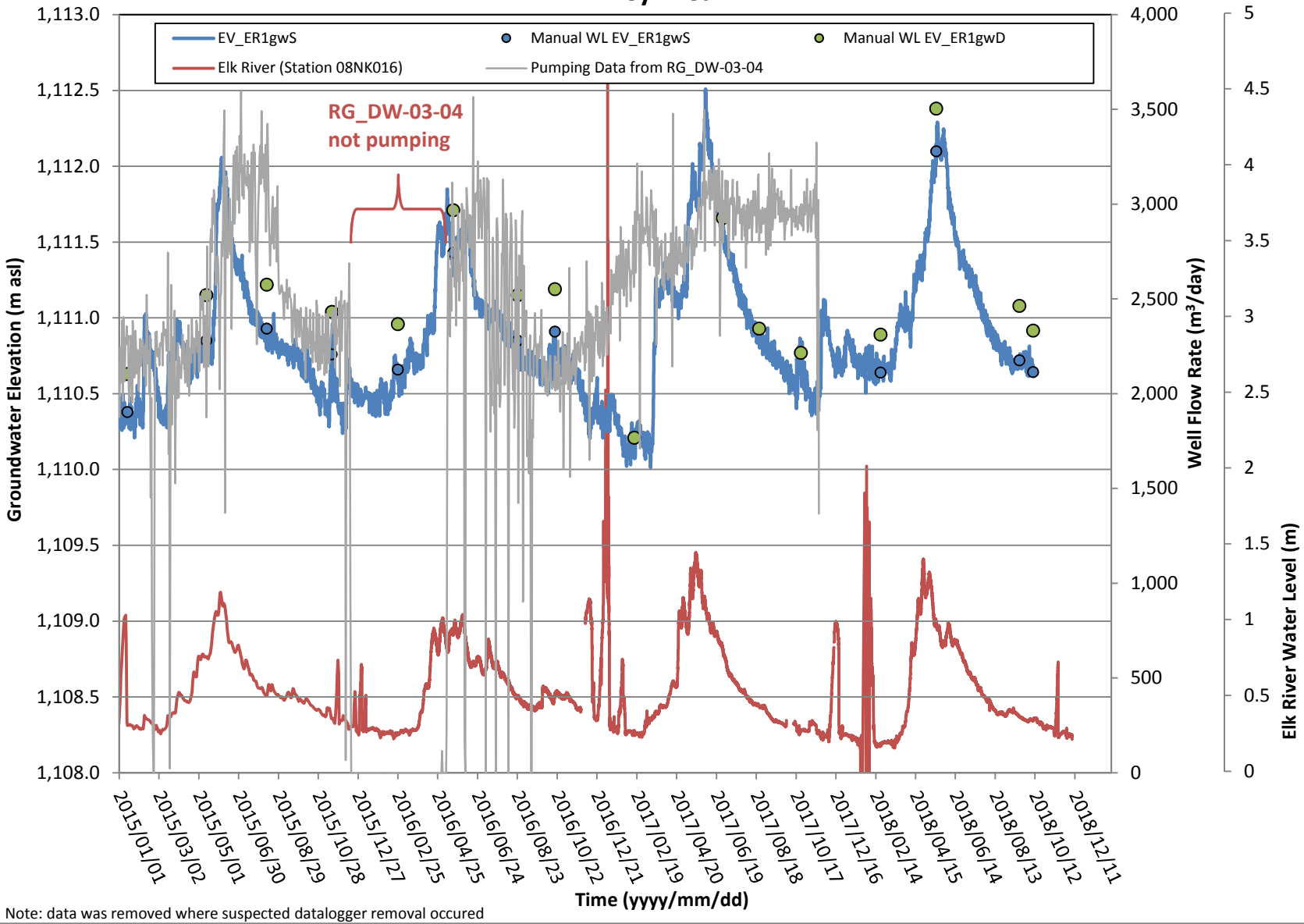
Graph 11-2: Selenium Concentrations in Study Area 11



Graph 11-3: Sulphate Concentrations in Study Area 11

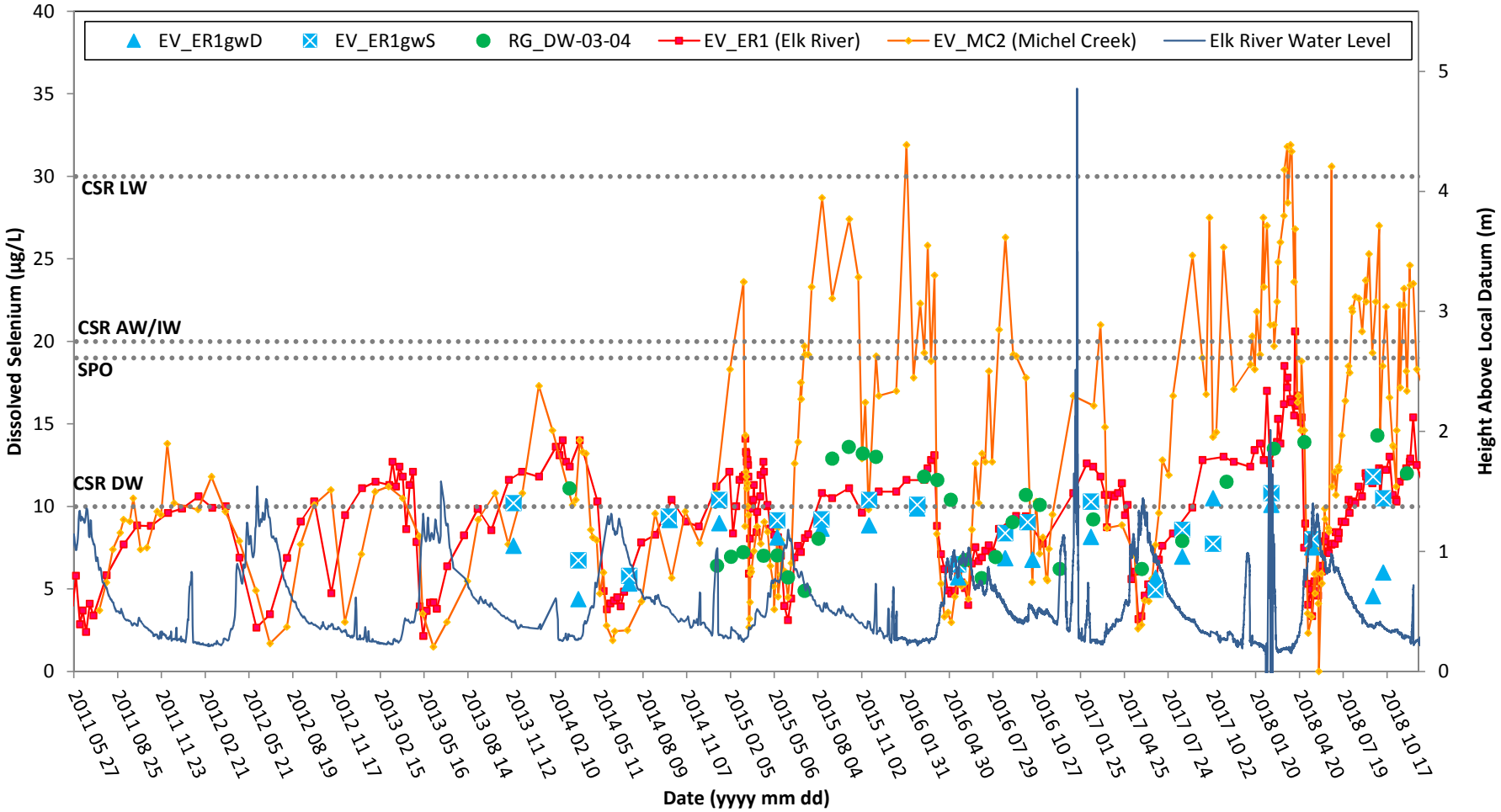


Graph 12-1: Groundwater Elevation, Pumping Rate and Elk River Water Level in Key Area 12



Note: data was removed where suspected datalogger removal occured

Graph 12-2:
Selenium Concentrations in Study Area 12 and Elk River Water Level

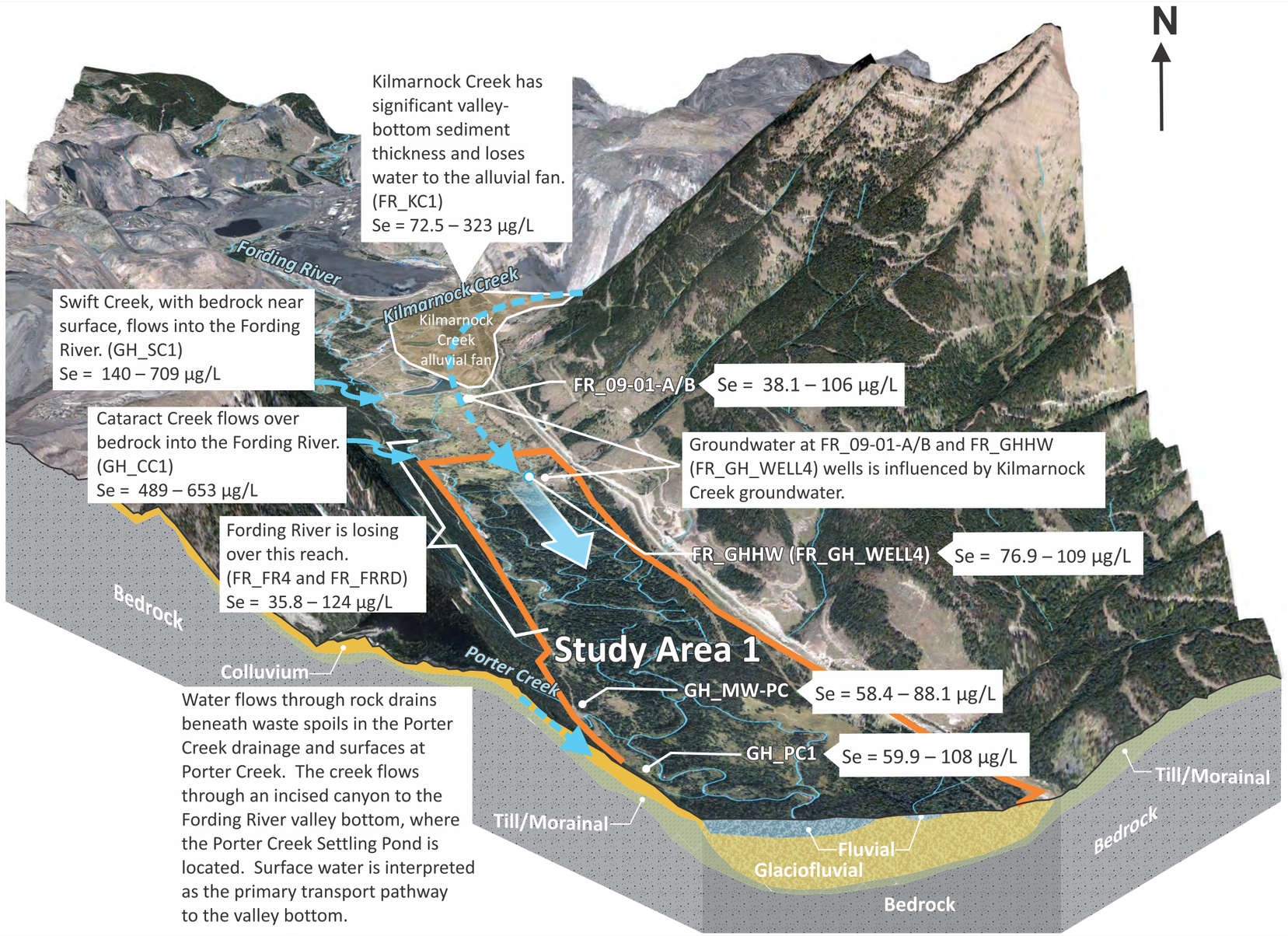


Note: Total selenium concentrations shown at RG_DW-03-04 and EV_ER1gwD prior to 2017 02 20.
Elk River water levels were obtained from Environment Canada Station 08NK016 (https://wateroffice.ec.gc.ca)

Appendix VII

Block Diagrams

- Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 1
- Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 2
- Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 3
- Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 4
- Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 5/6
- Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 7
- Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 8
- Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 9 and 12
- Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 10
- Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 11



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:
1. Graphics by Brick Tudor Studios, LLC.

NOTES:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale, however scale bar will remain accurate.
3. All concentrations shown are for 2018 minimum and maximum unless otherwise stated.
4. Subsurface geology is not to scale.
5. Vertical exaggeration 2x for topographic profile.
6. Surface water and groundwater concentrations are dissolved selenium

REVISIONS:
0 - AO - 2018-10-24 - DRAFT - KM

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

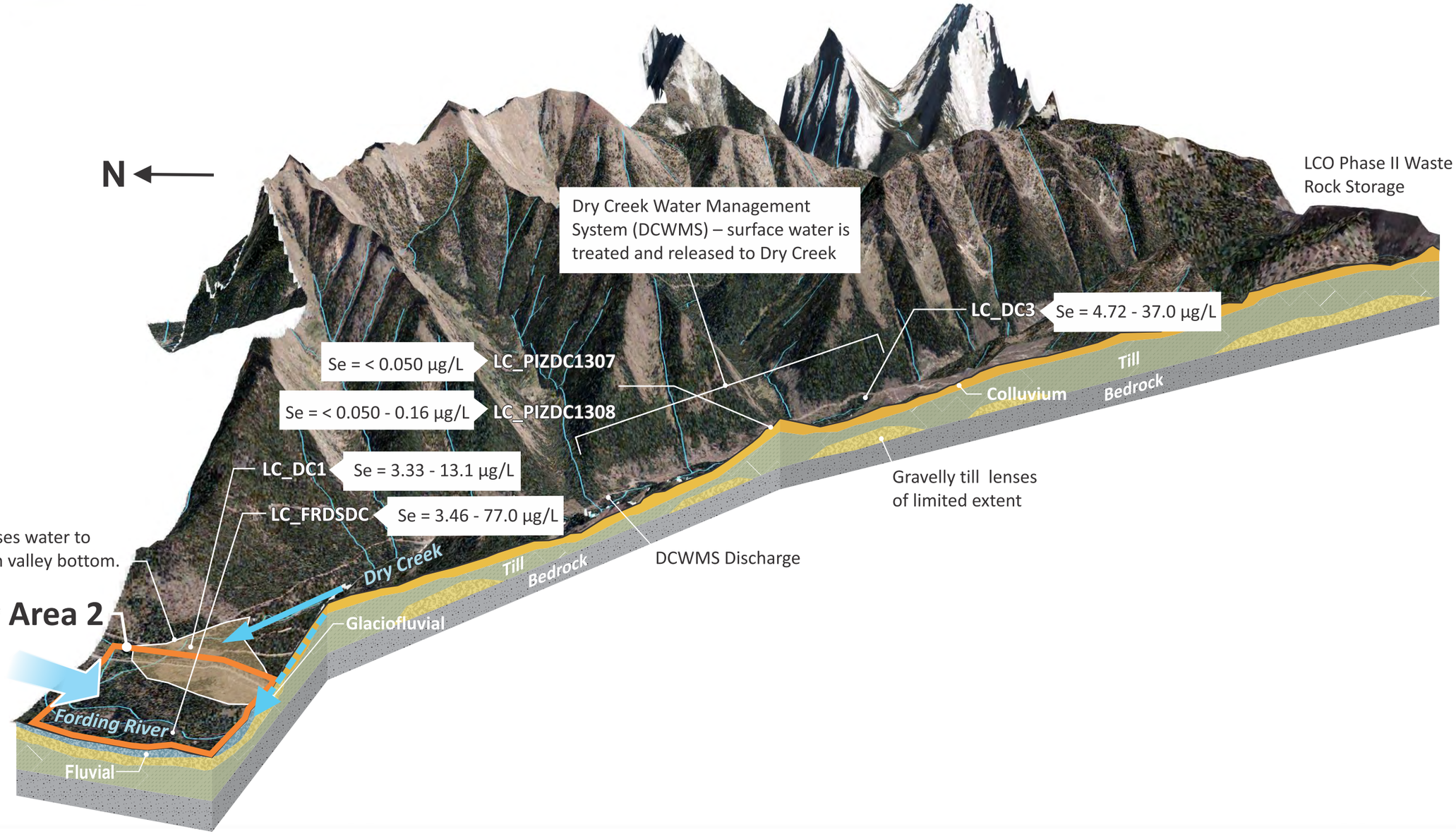
Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 1

BY: | SCALE: | DATE: | REF No: | REV: 0

CHK'D: | Proj Coord Sys: | FIGURE 1

MXD Path:

Project Path:



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:
1. GRAPHICS BY BRICK TUDOR STUDIOS, LLC
2. BCGOV ILMB Crown Registry and Geographic Base Branch (CRGB) (data accessed through www.GeoBC.gov.bc.ca)

NOTES:
1. Original in colour.
2. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.
3. All concentrations shown are for 2018 minimum and maximum unless otherwise stated.
4. Sub-surface geology not to scale.
5. Vertical exaggeration 2x for topographic profile.

REVISIONS:

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

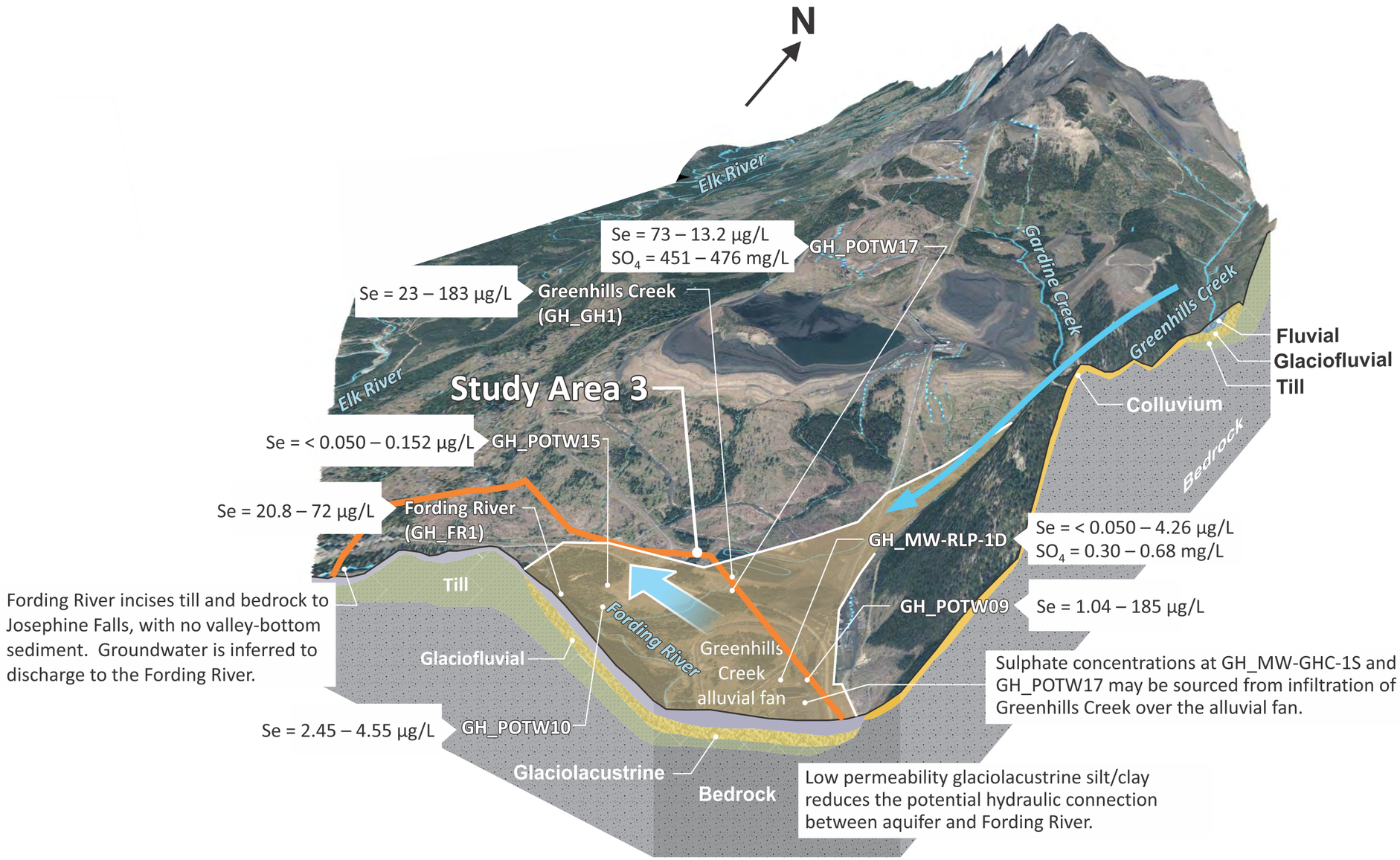
SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 2

BY:	SCALE:	DATE:	REF No:	REV: 0
CHK'D:	Proj Coord Sys:		FIGURE 2	

MXD Path:

Project Path:



Fording River incises till and bedrock to Josephine Falls, with no valley-bottom sediment. Groundwater is inferred to discharge to the Fording River.

Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:
1. Graphics by Brick Tudor Studios, LLC.

NOTES:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale, however scale bar will remain accurate.
3. All concentrations shown are for 2018 minimum and maximum unless otherwise stated.
4. Subsurface geology is not to scale.
5. Vertical exaggeration 2x for topographic profile.
6. Surface water and groundwater concentrations are dissolved selenium

REVISIONS:
0 - AO - 2018-10-24 - DRAFT - KM

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 3

BY: | SCALE: | DATE:

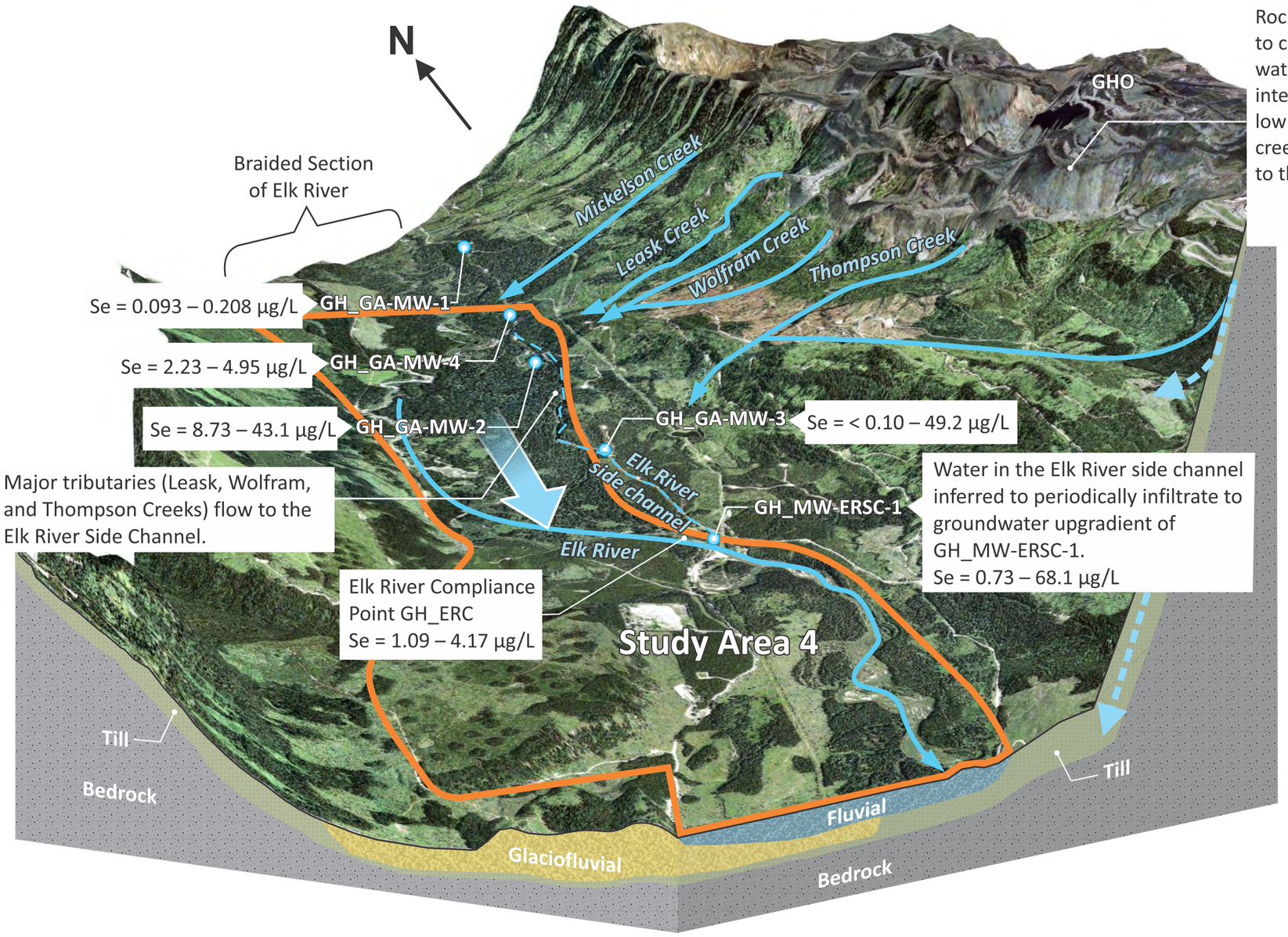
CHK'D: | Proj Coord Sys:

REF No: | REV: 0

FIGURE 3

MXD Path:

Project Path:



Rock drains through waste spoils and flows to creeks on the valley flanks. Mine-contact water from pit dewatering is also intermittently discharged to creeks. Due to low permeability till on the valley flanks, creeks are the primary transport pathway to the valley bottom.

Water in the Elk River side channel inferred to periodically infiltrate to groundwater upgradient of GH_MW-ERSC-1.
Se = 0.73 – 68.1 µg/L

Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:
1. Graphics by Brick Tudor Studios, LLC.

NOTES:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale, however scale bar will remain accurate.
3. All concentrations shown are for 2018 minimum and maximum unless otherwise stated.
4. Subsurface geology is not to scale.
5. Vertical exaggeration 2x for topographic profile.
6. Surface water and groundwater concentrations are dissolved selenium

REVISIONS:
0 - AO - 2018-10-24 - DRAFT - KM

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 4

BY: | SCALE: | DATE: | REF No: | REV: 0

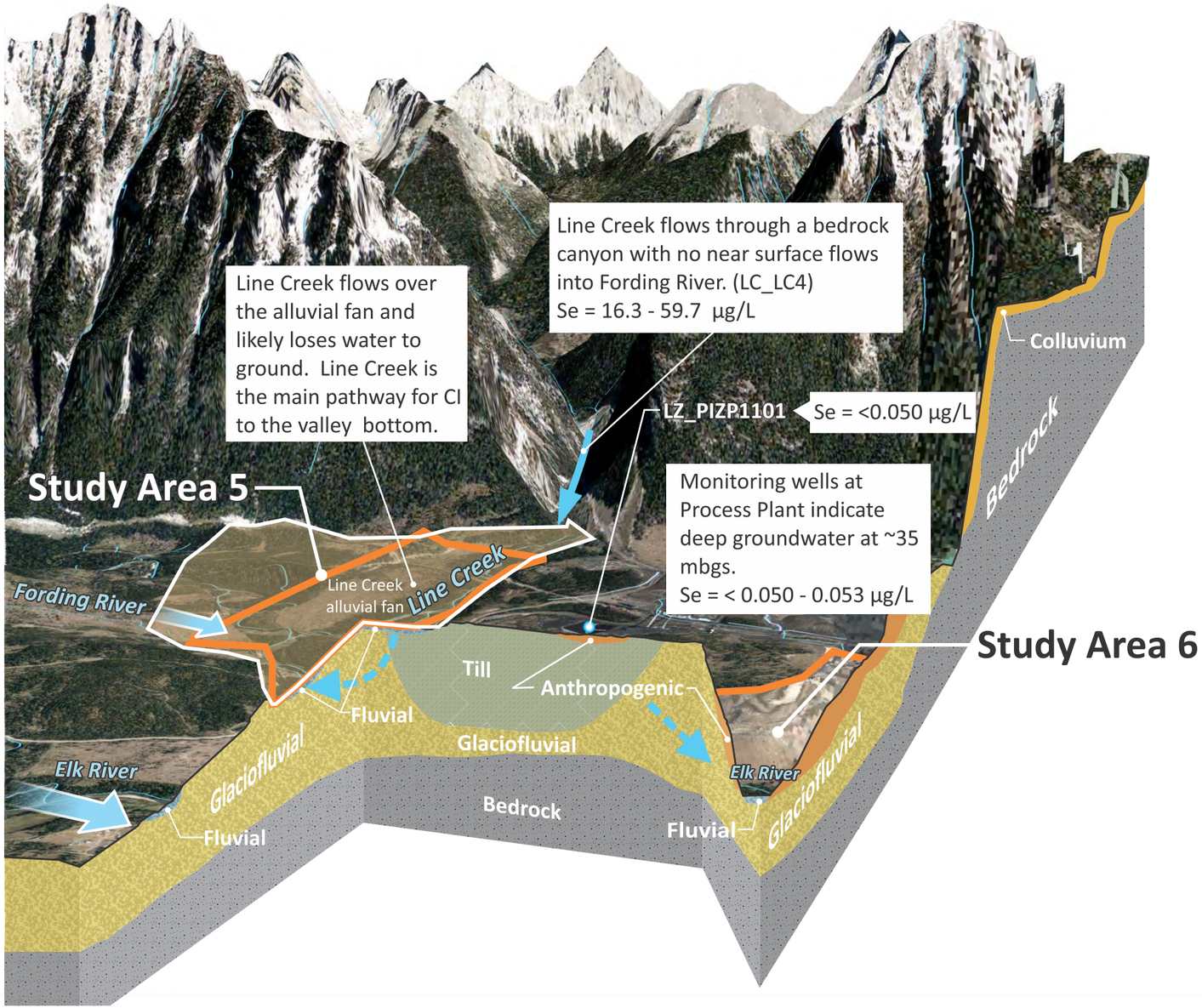
CHKD: | Proj Coord Sys:

FIGURE 4

NAD Path:

Project Path:

N



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:
1. GRAPHICS BY BRICK TUDOR STUDIOS, LLC
2. BCGOV ILMB Crown Registry and Geographic Base Branch (CRGB)
(data accessed through www.GeoBC.gov.bc.ca)

NOTES:
1. Original in colour.
2. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.
3. All concentrations shown are for 2018 minimum and maximum unless otherwise stated.
4. Sub-surface geology not to scale.
5. Vertical exaggeration 2x for topographic profile.

REVISIONS:

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

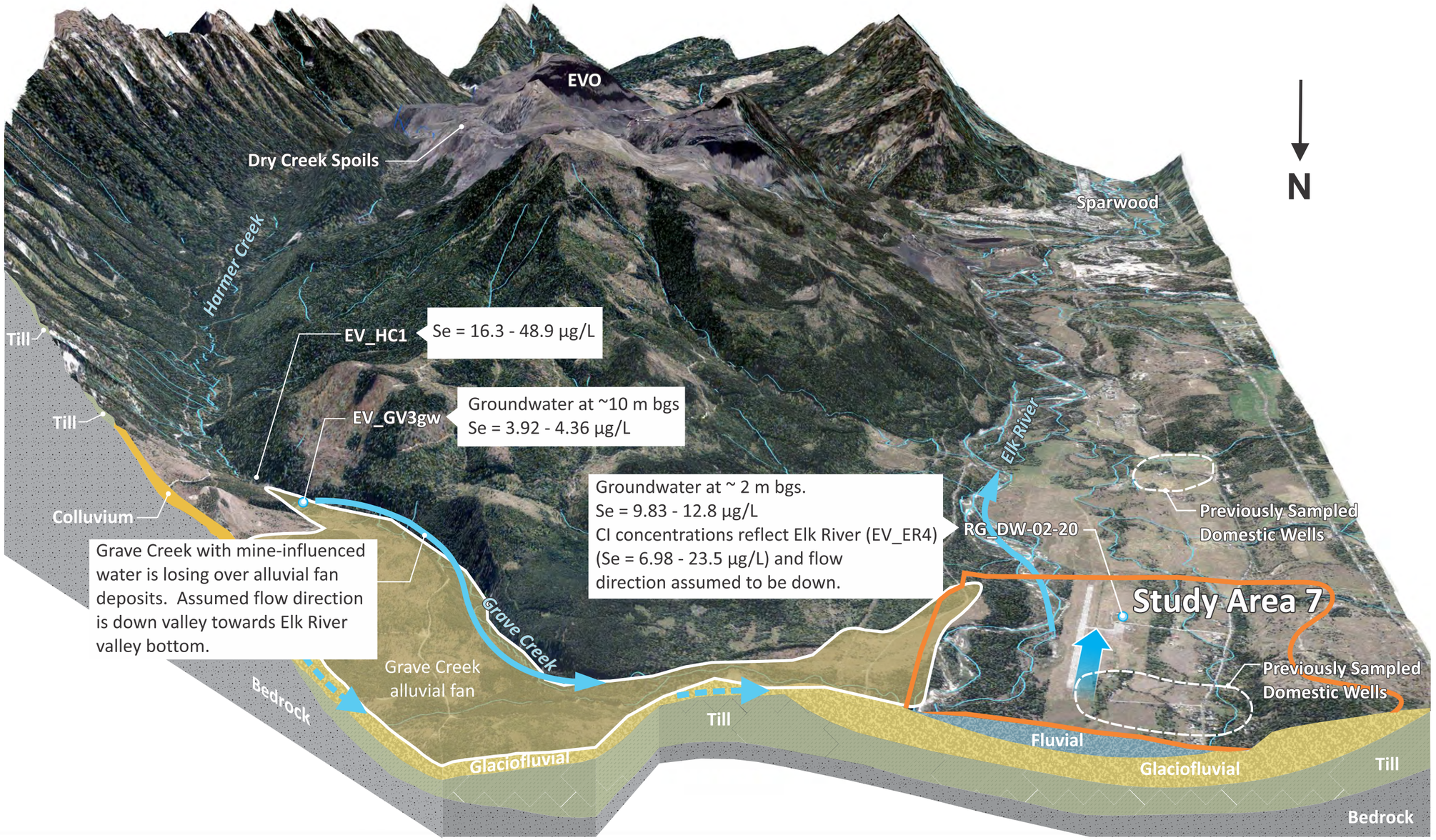
SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Areas 5/6

BY:	SCALE:	DATE:	REF No:	REV: 0
CHK'D:	Proj Coord Sys:		FIGURE 5	

MXD Path:

Project Path:



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:
1. GRAPHICS BY BRICK TUDOR STUDIOS, LLC
2. BCGOV ILMB Crown Registry and Geographic Base Branch (CRGB)
(data accessed through www.GeoBC.gov.bc.ca)

NOTES:
1. Original in colour.
2. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.
3. All concentrations shown are for 2018 minimum and maximum unless otherwise stated.
4. Sub-surface geology not to scale.
5. Vertical exaggeration 2x for topographic profile.

REVISIONS:

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 7

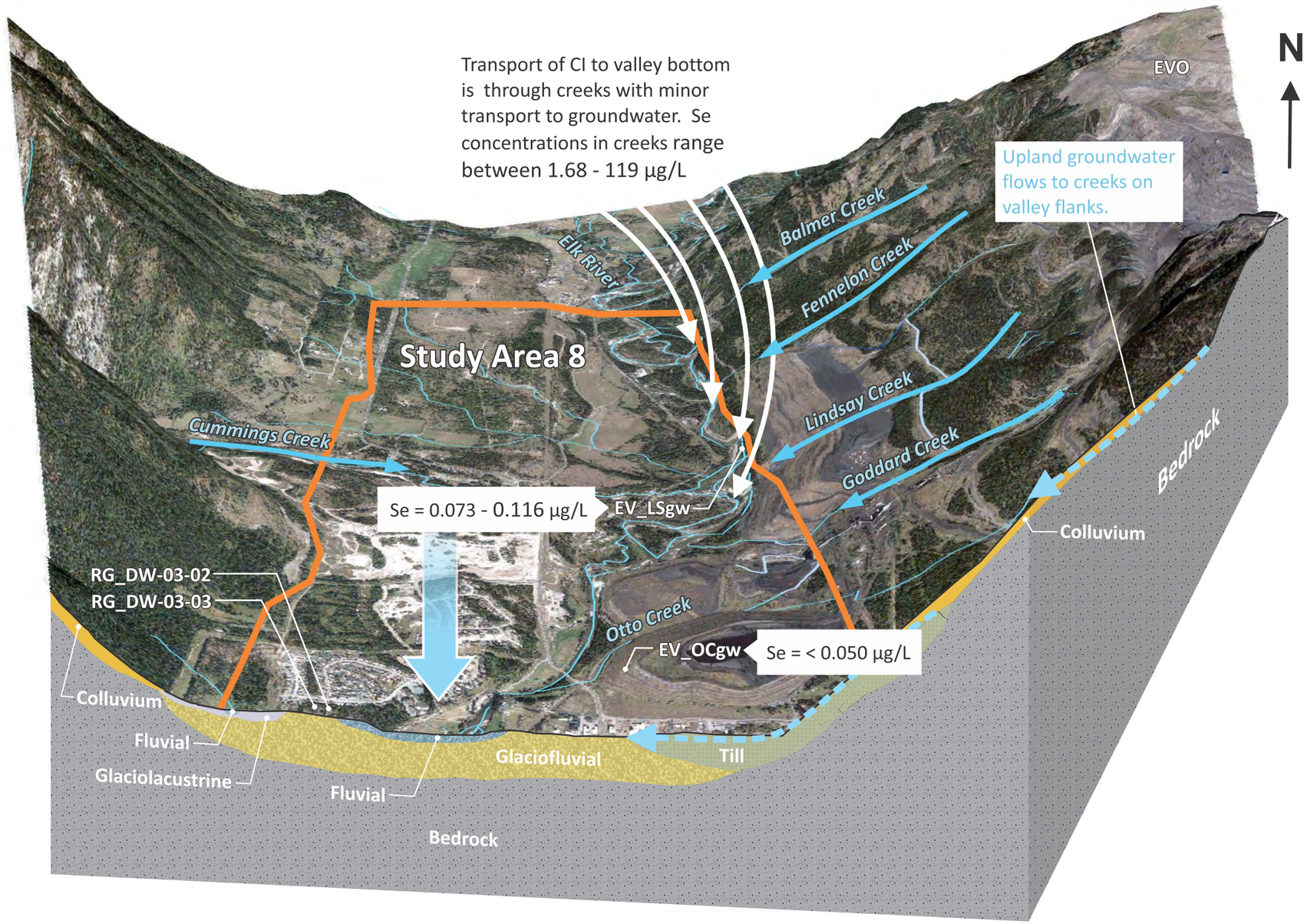
BY: | SCALE: | DATE: | REF No: | REV: 0

CHK'D: | Proj Coord Sys:

FIGURE 6

MXD Path:

Project Path:



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:
1. GRAPHICS BY BRICK TUDOR STUDIOS, LLC
2. BCGOV ILMB Crown Registry and Geographic Base Branch (CRGB) (data accessed through www.GeoBC.gov.bc.ca)

NOTES:
1. Original in colour.
2. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.
3. All concentrations shown are for 2018 minimum and maximum unless otherwise stated.
4. Sub-surface geology not to scale.
5. Vertical exaggeration 2x for topographic profile.

REVISIONS:

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 8

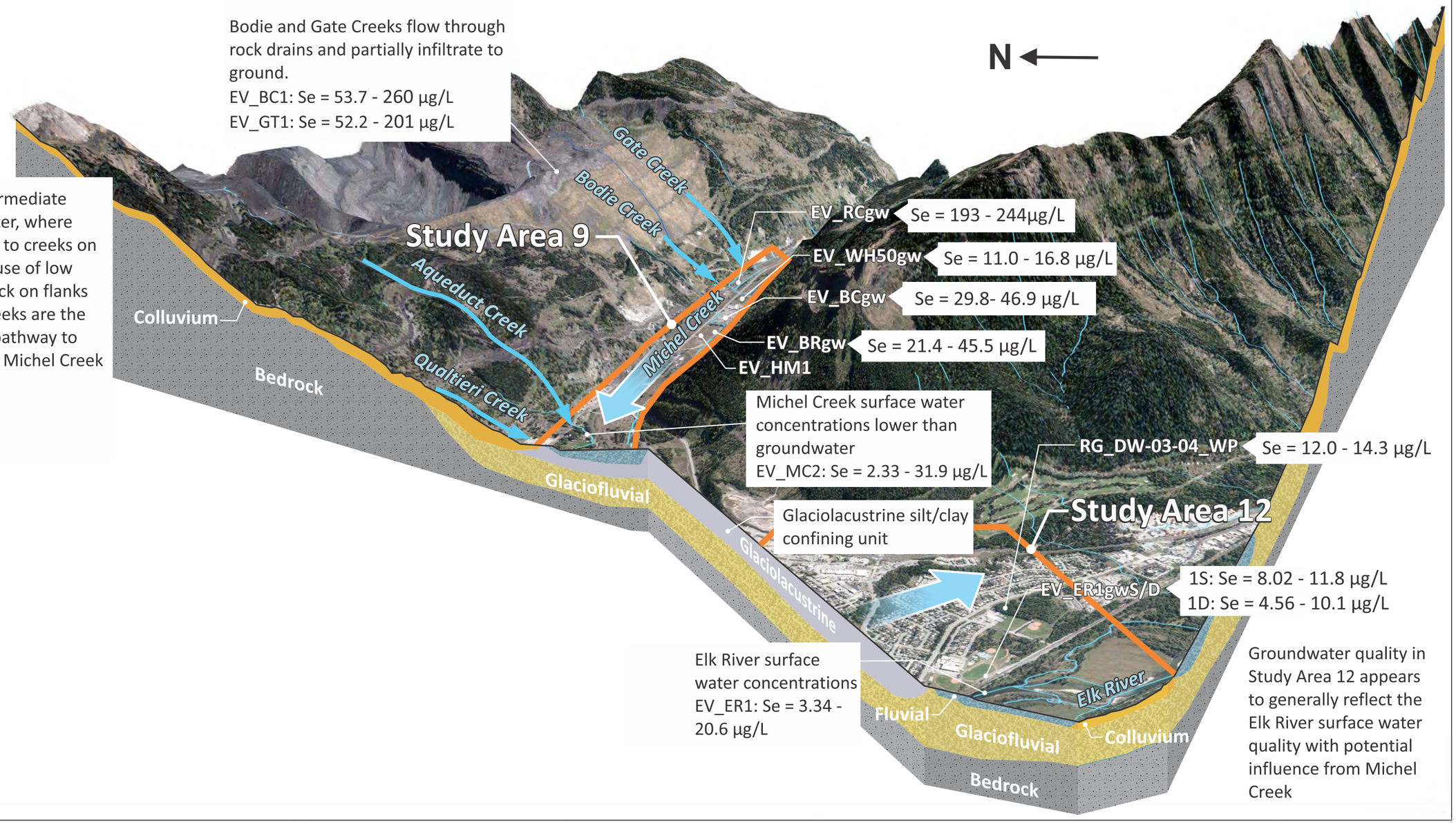
BY:	SCALE:	DATE:	REF No:	REV: 0
CHK'D:	Proj Coord Sys:		FIGURE 7	

MXD Path:

Project Path:

Bodie and Gate Creeks flow through rock drains and partially infiltrate to ground.
EV_BC1: Se = 53.7 - 260 µg/L
EV_GT1: Se = 52.2 - 201 µg/L

Upland and/or intermediate bedrock groundwater, where present, discharges to creeks on valley flanks. Because of low permeability bedrock on flanks and steep relief, creeks are the primary transport pathway to groundwater in the Michel Creek valley bottom.



Elk River surface water concentrations
EV_ER1: Se = 3.34 - 20.6 µg/L

Groundwater quality in Study Area 12 appears to generally reflect the Elk River surface water quality with potential influence from Michel Creek

Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:
1. GRAPHICS BY BRICK TUDOR STUDIOS, LLC
2. BCGOV ILMB Crown Registry and Geographic Base Branch (CRGB)
(data accessed through www.GeoBC.gov.bc.ca)

NOTES:
1. Original in colour.
2. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.
3. All concentrations shown are for 2018 minimum and maximum unless otherwise stated.
4. Sub-surface geology not to scale.
5. Vertical exaggeration 2x for topographic profile.

REVISIONS:

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

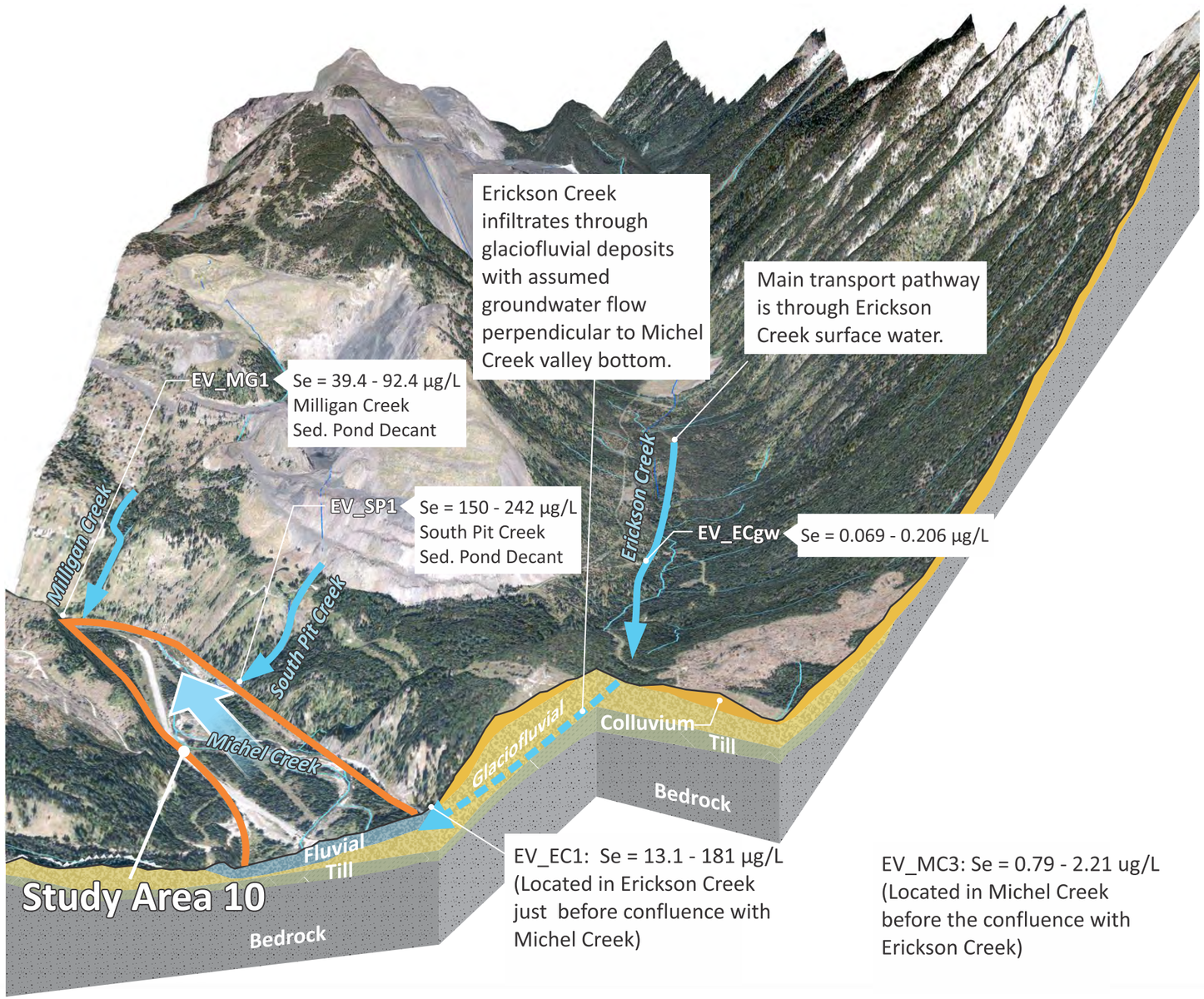
Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Areas 9 and 12

BY: | SCALE: | DATE: | REF No: | REV: 0

CHK'D: | Proj Coord Sys: | **FIGURE 8**

MXD Path:

Project Path:



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:
1. GRAPHICS BY BRICK TUDOR STUDIOS, LLC
2. BCGOV ILMB Crown Registry and Geographic Base Branch (CRGB) (data accessed through www.GeoBC.gov.bc.ca)

NOTES:
1. Original in colour.
2. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.
3. All concentrations shown are for 2018 minimum and maximum unless otherwise stated.
4. Sub-surface geology not to scale.
5. Vertical exaggeration 2x for topographic profile.

REVISIONS:

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

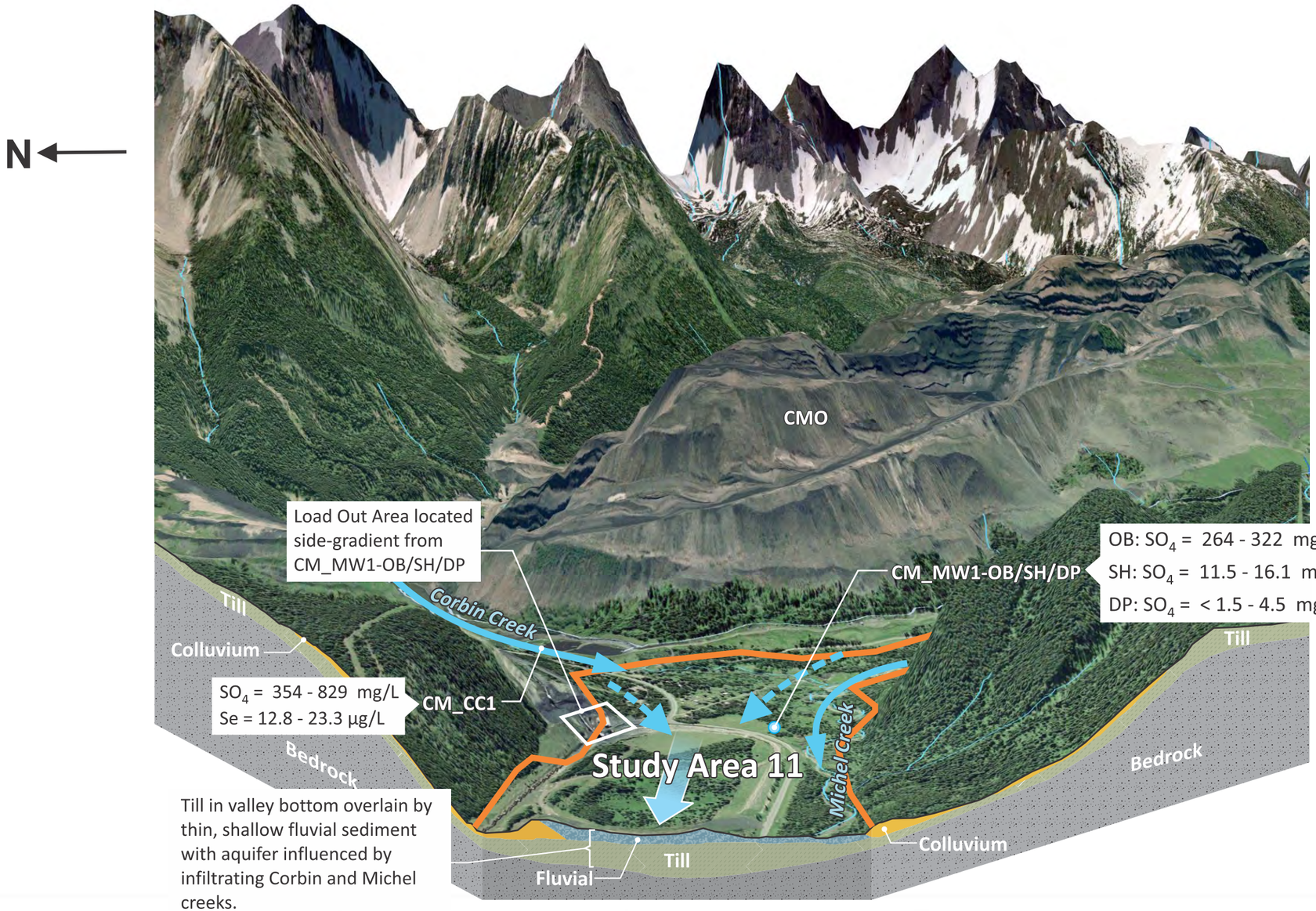
Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 10

BY: | SCALE: | DATE: | REF No: | REV: 0

CHK'D: | Proj Coord Sys: | **FIGURE 9**

MXD Path:

Project Path:



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:
1. GRAPHICS BY BRICK TUDOR STUDIOS, LLC
2. BCGOV ILMB Crown Registry and Geographic Base Branch (CRGB) (data accessed through www.GeoBC.gov.bc.ca)

NOTES:
1. Original in colour.
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3. All concentrations shown are for 2018 minimum and maximum unless otherwise stated.
4. Sub-surface geology not to scale.
5. Vertical exaggeration 2x for topographic profile.

REVISIONS:

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Constituents of Interest in Study Area 11

BY:	SCALE:	DATE:	REF No:	REV: 0
CHK'D:	Proj Coord Sys:		FIGURE 10	

MXD Path:

Project Path:

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who fulfill regulatory requirements on behalf of regulated persons seeking authorization under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Headquarters Office at 1-800-663-7867.

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration

I, Stefan Humphries (Print First and Last Name) as a member of EGBC (Print Name of Professional Association) declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this RGMP 2018 Annual Report (application/project/work/report). I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Douglas Hill (Ministry Contact Name), erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

_____

_____

_____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:

X _____

Print name: Stefan Humphries

Date: May 16/19

Witnessed by:

X _____

Print name: Stacey Charlton

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

This declaration of competency is collected for the purposes of increasing government transparency and ensuring professional ethics and accountability. It will be disclosed to the public.

1. Name of Qualified Professional Stefan Humphries

   Title Senior Hydrogeologist

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: EGBC

3. Brief description of professional services:

   Hydrogeology / Groundwater

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X _____

Print Name: Stefan Humphries

Date signed: May 16/19

Witnessed by:

X _____

Print Name: STACEY CHARLTON

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who fulfill regulatory requirements on behalf of regulated persons seeking authorization under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Headquarters Office at 1-800-663-7867.

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration

I, Kirsti Medig (Print First and Last Name) as a member of EGBC (Print Name of Professional Association) declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this 2018 RGMP Annual Report (application/submission/work). I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Douglas Hill (Print Name), erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

_____

_____

_____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:

x Kirsti Medig

Print name: KIRSTI MEDIG

Date: May 16, 2019

Witnessed by:

x Chris Bullock

Print name: CHRIS BULLOCK

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

This declaration of competency is collected for the purposes of increasing government transparency and ensuring professional ethics and accountability. It will be disclosed to the public.

1. Name of Qualified Professional: Kirsti Medig

   Title: Project Geologist

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: Engineers + Geoscientists BC

3. Brief description of professional services:

   Environmental Consulting

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

x Kirsti Medig

Print Name: Kirsti Medig

Date signed: May 16, 2019

Witnessed by:

x [signature]

Print Name: C. Bullock

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

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[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration

I, SHANNON HOLDING (Print First and Last Name) as a member of EGBC (Print Name of Professional Association) declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this RGM 2019 Annual Report (Application/project/work). I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to DOUGLAS (Insert Ministry Contact Name), erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

____

____

____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

____

____

____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:	Witnessed by:
X [signature]	X [signature]
Print name: SHANNON HOLDING	Print name: Andrew Wan
Date: 16th May 2019	

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

This declaration of competency is collected for the purposes of increasing government transparency and ensuring professional ethics and accountability. It will be disclosed to the public.

1. Name of Qualified Professional SHANNON HOLDING

   Title PROJECT HYDROGEOLOGIST

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: EGBC

3. Brief description of professional services:

   HYDROGEOLOGY | GROUNDWATER SERVICES

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X Shannon Holding

Print Name: SHANNON HOLDING

Date signed: 16th May 2019

Witnessed by:

X

Print Name: Andrew Wan

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who fulfill regulatory requirements on behalf of regulated persons seeking authorization under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Headquarters Office at 1-800-663-7867.

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration

I, Katrina Cheung (Print First and Last Name) as a member of EGBC (Print Name of Professional Association) declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this RGMP Boat Moorage Report (Application/Project/Work/etc.). I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Doug Woolsey (Ministry Contact Name), erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

_____

_____

_____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:

X _____

Print name: Katrina Cheung

Date: May 16 '19

Witnessed by:

X _____

Print name: Andrew Wan

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

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1. Name of Qualified Professional Katrina Cheung

   Title Hydrogeologist

2. Are you a registered member of a professional association in B.C.? ☒ Yes ☐ No

   Name of Association: EGBC

3. Brief description of professional services:

   2018 Annual Groundwater Monitoring Report for the Regional Groundwater Monitoring Program

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X _____

Print Name: Katrina Cheung

Date signed: May 16 '19

Witnessed by:

X _____

Print Name: Andrew Wan

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a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

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