



November 19, 2021

Tracking Number: 408704
Authorization Number: 107517

REGISTERED MAIL

Teck Coal Limited
3300-550 Burrard ST
Vancouver, BC V6C 0B3

Dear Permittee:

Enclosed is Amended Permit 107517 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the permit. An annual fee will be determined according to the Permit Fees Regulation.

This permit does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the permittee. This permit is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties and comply with other applicable legislation that may be in force.

When a spill occurs, or there is an imminent risk of one occurring, the responsible person must ensure that it is reported in accordance with the Spill Reporting Regulation. Additional information on spill reporting requirements is available at gov.bc.ca/reportaspill

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this permit will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the permit are to be submitted by email or electronic transfer to the director, designated officer, or as further instructed.

Please be reminded that the director may require the permittee to do one or more of the following at any time:

- repair, alter, remove, improve or add to existing works, or to construct new works, and to submit plans and specifications for works specified in this authorization.
- conduct monitoring, and may specify procedures for monitoring and analysis, and procedures or requirements respecting the handling, treatment, transportation, discharge or storage of waste.
- provide security in the amount and form, and subject to the conditions, specified by the director.
- conduct studies and to report information in accordance with the specifications of the director.
- recycle certain wastes and recover certain reusable resources, including energy potential from wastes, in accordance with the specifications of the director.

For more information about how the Ministry will assess compliance with your permit please refer to gov.bc.ca/environmentalcompliance.

For more information about how to make changes to your permit and to access waste discharge amendment forms and guidance, please refer to gov.bc.ca/wastedischarge-authorizations.

Yours truly,



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*



**MINISTRY OF ENVIRONMENT
AND CLIMATE CHANGE
STRATEGY**

PERMIT

107517

Under the Provisions of the Environmental Management Act

Teck Coal Limited

**3300-550 Burrard ST
Vancouver, BC V6C 0B3**

is authorized to discharge effluent to the land and water from five coal mine sites located within the Elk Valley near Elkford and Sparwood, British Columbia, subject to the terms and conditions listed below. Contravention of any of these conditions is a violation of the *Environmental Management Act* and may lead to prosecution.

The terms and conditions included in this permit are intended to ensure implementation of commitments and processes contained in the Elk Valley Area Based Management Plan approved November 18, 2014. Should any conflict exist between this permit and the Elk Valley Area Based Management Plan, the permit requirements take precedence.

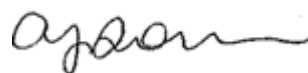
Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

TABLE OF CONTENTS

1. DEFINITIONS AND GLOSSARY	pg.3
2. AUTHORIZED DISCHARGES	pg.6
3. SITE PERFORMANCE OBJECTIVES	pg.14
4. TRIBUTARY EVALUATION AND MANAGEMENT	pg.24
5. CONTAMINANT MANAGEMENT PLANS	pg.27
6. GENERAL REQUIREMENTS	pg.31
7. ABMP COMMITMENTS	pg.35
8. MONITORING REQUIREMENTS	pg.38
9. REPORTING REQUIREMENTS	pg.65
10. ADAPTIVE MANAGEMENT	pg.77
11. DATA ANALYSIS ACCOUNTABILITY AND TRANSPARENCY	pg.81
12. SECURITY	pg.83
13. PUBLICATION OF DOCUMENTS	pg.83
APPENDIX 1:	TECK COAL LIMITED OPERATIONS MAPS
APPENDIX 2:	SURFACE WATER DISCHARGE AND RECEIVING ENVIRONMENT MONITORING PROGRAM
APPENDIX 3:	MONITORING PROGRAM NOTES AND EXPLANATIONS
APPENDIX 4:	SELENIUM AND NITRATE TREATMENT FACILITIES
APPENDIX 5:	CALCITE TREATMENT FACILITIES

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

1. DEFINITIONS AND GLOSSARY

Unless otherwise defined, all terms used in this permit are defined as in the Area Based Management Plan titled “The Elk Valley Water Quality Plan”, approved November 18, 2014.

ABMP: Area Based Management Plan titled “The Elk Valley Water Quality Plan”.

AMP: Adaptive Management Plan

AWTF: Active Water Treatment Facility

BCWQG FWAL: British Columbia Water Quality Guideline for Fresh Water Aquatic Life

CMO: Coal Mountain Operations as described in the latest approved *Mines Act* Permit C-84

Compliance Point: an effluent monitoring location specified in the permit at which discharge limits apply

Designated Area: a portion of southeastern British Columbia that contains the Elk Valley Watershed and the portion of Koocanusa Reservoir within Canada, and is geographically defined by Ministerial Order M113 (references to the Elk Valley are references to the Designated Area)

EVWQP: The Area Based Management Plan titled ‘The Elk Valley Water Quality Plan’

EMC: Environmental Monitoring Committee

EMS: Environmental Monitoring System (provincial environmental quality data base)

EVO: Elkview Operations as described in the latest approved *Mines Act* Permit C-2

FRO: Fording River Operations as described in the latest approved *Mines Act* Permit C-3

GHO: Greenhills Operations as described in the latest approved *Mines Act* Permit C-137

KNC: Ktunaxa Nation Council

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

LAEMP: Local Aquatic Effects Monitoring Program

LCO: Line Creek Operations as described in the latest approved *Mines Act* Permit C-129, including Phase I and Phase II

LCO Phase I: permitted mining area in upper portion of Line Creek.

LCO Phase II: permitted mining area in LCO Dry Creek watershed.

Order (the): Ministerial Order number M113, which was the directive issued by the B.C. Minister of Environment in April 2013 requiring Teck Coal Limited to develop an Area Based Management Plan for the Designated Area in the Elk Valley.

Order Constituents: Identified in Ministerial Order M113: selenium, cadmium, nitrate, and sulphate.

Order station: a monitoring location specified by the Order to monitor water quality in the Designated Area, at which site performance objectives apply

Parameter of Concern: any physical, chemical, or biological substance in air, soil or water at a concentration, or predicted to be at a concentration that exceeds regulatory thresholds, or may have an adverse effect on environmental or human health receptors

RAEMP: Regional Aquatic Effects Monitoring Program

Regulatory Document: means any document that the permittee is required to provide to the director or the Province pursuant to:

- i. This authorization;
- ii. Any regulation made under the *Environmental Management Act* that regulates the facilities described in this authorization or the discharge of waste from those facilities; or
- iii. Any order issued under the *Environmental Management Act* directed against the permittee that is related to the facilities described in this authorization or the discharge of waste from those facilities.

SPO: Site Performance Objective

SRF: Saturated Rock Fill Water Treatment Facility

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

Standing Water: For Section 8.1.2.4, Table 8A, standing water is defined as pooled effluent in the Floodplain Widening Sediment Pond of at least 0.5 metre depth, with no decant occurring from the pond.

WLC: West Line Creek

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

2. AUTHORIZED DISCHARGES

Sections 2.1 to 2.7 refer to compliance points that correspond to locations where all or most of the point and non-point discharges from a mine site or specified portions of a mine site are expected to accumulate. These accumulated discharges are subject to the concentration limits (the “limits”) at the compliance points.

For Sections 2.1 to 2.7, the limits are expressed as monthly average concentrations and/or specified daily maximums. The monthly average concentration is defined as the average value of measured concentrations for all samples collected in a calendar month at the sample location, except for months when there is an authorized bypass of a selenium and nitrate treatment facility and enhanced monitoring occurs. With enhanced monitoring, as per Appendix 4, the monthly average concentration shall be calculated as follows:

$$CMo = [(\Sigma C24/N24)*(D24/DMo)] + [(\Sigma CR/NR)*((DMo-D24)/DMo)]$$

Where:

- CMo is the monthly average concentration;
- C24 are the concentrations of the samples collected during a 24-hour recirculation in the month;
- N24 are the number of samples collected during a 24-hour recirculation in the month;
- D24 is the number of days in 24-hour recirculation in the month;
- DMo is the number of days in the month;
- CR are the concentrations of the routine samples collected in the month;
- and
- NR are the number of routine samples collected in the month

For months where only one result is collected, that result shall be compared to both the monthly average and daily maximum limits. Daily maximums are defined as any single grab sample.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

2.1 **FORDING RIVER OPERATIONS – FORDING RIVER COMPLIANCE POINT (FR FRABCH)**

This section applies to effluent from Teck Coal Limited mine operations (Fording River Operations and the Greenhills Operations into the Fording River watershed) upstream of FRO Compliance Point (EMS E223753). The FRO Compliance Point (EMS E223753) is located approximately 100 m upstream of Chauncey Creek as shown in Appendix 1.

- 2.1.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE	
PARAMETERS	Mar. 10, 2021	Dec. 31, 2023
Total selenium (µg/L)	85	58
Nitrate as N (mg/L)	18.0	12.0
Sulphate (mg/L)	577	605

- 2.1.2 The characteristic of the effluent at the compliance point must not exceed the following daily maximums:

DAILY MAXIMUM	EFFECTIVE DATE	
PARAMETERS	Dec.31, 2021	Dec. 31, 2023
Total selenium (µg/L)	100	67
Nitrate as N (mg/L)	21.0	14.0

- 2.1.3 The authorized works associated with this compliance point are tailings impoundments, sedimentation and infiltration ponds, diversions, ditches, pipelines and pumping, active water treatment facility, antiscalant addition systems, sewage treatment plants, and related appurtenances.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

2.2 **GREENHILLS OPERATIONS – FORDING RIVER COMPLIANCE POINT (GH FR1)**

This section applies to effluent from Teck Coal Limited mine operations (Fording River Operations, Greenhill Operations and Line Creek Operations) upstream of GHO Fording River Compliance Point (EMS 0200378). The GHO Fording River Compliance Point (EMS 0200378) is located 205 m downstream of Greenhills Creek as shown in Appendix 1.

2.2.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE		EFFECTIVE DATE	
PARAMETERS	Nov. 19, 2014	Dec. 31, 2019	Dec. 31, 2023
Total selenium (µg/L)	80	63	57
Nitrate as N (mg/L)	20	14.0	11.0

2.2.2 The characteristics of the effluent at the compliance point must not exceed the following daily maximums:

DAILY MAXIMUM		EFFECTIVE DATE	
PARAMETERS	Nov. 19, 2014	Dec. 31, 2019	Dec. 31, 2023
Total selenium (µg/L)	100	78	62
Nitrate as N (mg/L)	29	17.0	15.0

2.2.3 The authorized works associated with this compliance point are tailings impoundments, sedimentation and infiltration ponds, diversions, sewage treatment plants, antiscalant addition system, and related appurtenances.

2.3 **GREENHILLS OPERATIONS – ELK RIVER COMPLIANCE POINT (GH ERC)**

This section applies to effluent from Teck Coal Limited mine operations (Greenhills Operations into the Elk River watershed) upstream of GHO Elk River Compliance Point (EMS 300090). The GHO Elk River Compliance Point (EMS 300090) is located 220 m downstream of Thompson Creek as shown in Appendix 1.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- 2.3.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE	
PARAMETERS	Immediately	Dec. 31, 2027
Total selenium ($\mu\text{g/L}$)	15	8
Nitrate as N (mg/L)	3.0	3.0

- 2.3.2 The authorized works associated with this compliance point are tailings impoundments, sedimentation and infiltration ponds, diversions, sewage treatment plants and related appurtenances.

2.4 **LINE CREEK OPERATIONS – LINE CREEK COMPLIANCE POINT (LC LCDSSLCC)**

This section applies to effluent from Teck Coal Limited mine operations (Line Creek Operations into the Line Creek Watershed) above LCO Compliance Point (EMS E297110). The LCO Compliance Point (EMS E297110) is located approximately 1500 m downstream of the West Line Creek Active Water Treatment Facility (WLC AWTF) outfall as shown in Appendix 1.

- 2.4.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE		
PARAMETERS	Nov. 19, 2014	Dec. 31, 2015	Dec. 31, 2033
Total selenium ($\mu\text{g/L}$)	80	50	29
Nitrate as N (mg/L)	14	7.0	3.0

- 2.4.2 The characteristics of the effluent at the compliance point must not exceed the following daily maximums:

DAILY MAXIMUM	EFFECTIVE DATE		
PARAMETERS	Nov. 19, 2014	Dec. 31, 2015	Dec. 31, 2033
Total selenium ($\mu\text{g/L}$)	95	58	33
Nitrate as N (mg/L)	20	9.0	4.0

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- 2.4.3 The authorized works associated with this compliance point are tailings impoundments, sedimentation and infiltration ponds, active water treatment facility, diversions, sewage treatment plants, and related appurtenances.

2.5 ELKVIEW OPERATIONS – HARMER CREEK COMPLIANCE POINT (EV HC1)

This section applies to effluent from Teck Coal Limited mine operations (Elkview Operations into the Harmer Creek watershed) above EVO Harmer Compliance Point (EMS E102682). The EVO Harmer Compliance Point (EMS E102682) is located at the Harmer Spillway as shown in Appendix 1.

- 2.5.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

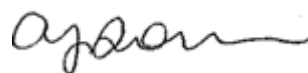
MONTHLY AVERAGE PARAMETERS	EFFECTIVE DATE		
	Nov. 19, 2014	Dec. 31, 2017	Dec. 31, 2021
Total selenium (µg/L)	45	57	57
Nitrate as N (mg/L)	4	16.0	8.0
Sulphate (mg/L)	300	380	450

- 2.5.2 The authorized works associated with this compliance point are sedimentation and infiltration ponds, diversions, and related appurtenances.

2.6 ELKVIEW OPERATIONS – MICHEL CREEK COMPLIANCE POINT (EV MC2)

This section applies to effluent from Teck Coal mine operations (Elkview Operations into the Michel Creek watershed) above EVO Michel Creek Compliance Point (EMS E300091). The EVO Michel Creek Compliance Point (EMS E300091) is located at the Highway 3 bridge over Michel Creek as shown in Appendix 1.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- 2.6.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE		
PARAMETERS	Nov.19, 2014	Dec. 31, 2021	Dec. 31, 2025
Total selenium (µg/L)	28	20	19
Nitrate as N (mg/L)	6.0	6.0	6.0

- 2.6.2 The authorized works associated with this compliance point are sedimentation and infiltration ponds, tailings impoundments, saturated rock fill treatment facility, diversions, sewage treatment plants, and related appurtenances.

2.7 **COAL MOUNTAIN OPERATIONS (CMO) – MICHEL CREEK COMPLIANCE POINT (CM MC2)**

This section applies to effluent from Teck Coal Limited mine operations (Coal Mountain Operations) above CMO Compliance Point (EMS E258937). The CMO Compliance Point (EMS E258937) is located 50 m upstream of Andy Goode Creek as shown in Appendix 1.

- 2.7.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE
PARAMETERS	Nov.19, 2014
Total selenium (µg/L)	19
Nitrate as N (mg/L)	5.0
Sulphate (mg/L)	500

- 2.7.2 The authorized works associated with this compliance point are sedimentation and infiltration ponds, diversions, sewage treatment plant, and related appurtenances.

2.8 **LCO DRY CREEK SEDIMENTATION PONDS TO DRY CREEK**

This section applies to the discharge of effluent from a diffuser and conveyance pipeline from the LCO Dry Creek (2) Sedimentation Ponds to the Fording River. The site reference number for this discharge is E295231.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- 2.8.1 The authorized works are the upper LCO Dry Creek Valley ditches, sumps, pumps, LCO Dry Creek rock drain, diversion embankment structure, dual lined head pond with leak detection and recovery system and spillway for flows in excess of Q10 up to Q200 flows, transfer pipeline, two dual lined sedimentation ponds with leak detection and recovery system and spillway for flows in excess of Q10, bypass works, return channel, decant structure, flocculant addition station, fish barrier and related appurtenances.
- 2.8.2 The location of the facilities from which the discharge originates and the location of the point of discharge is Lot 1 District Lot 4588, Kootenay District Plan NEP 21818. PID 019-075-308.
- 2.8.3 Controlled Bypasses to LCO Dry Creek
Bypass of the LCO Dry Creek Sedimentation Ponds via the bypass works is authorized by Permit 5353 on a seasonal basis, during non-freshet flows to reduce or avoid the generation of bioavailable selenium. A record of bypass of the LCO Dry Creek Sedimentation Ponds must be presented in the quarterly and annual reports.


2.9 LCO DRY CREEK SEDIMENTATION PONDS TO FORDING RIVER

This section applies to the discharge of effluent from a diffuser and conveyance pipeline from the LCO Dry Creek (2) Sedimentation Ponds to the Fording River. The site reference number for this discharge is E295231.

- 2.9.1 The maximum authorized rate of discharge is the Q10 flow of 1.8 cubic meters per second.
- 2.9.2 The characteristics of the discharge must not exceed:

Parameter	Limit
Total Dissolved Solids	1,982 mg/L
Nitrate	141 mg/L
Total Cadmium	0.0014 mg/L
Total Selenium	0.32 mg/L
Sulphate	1067 mg/L

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

- 2.9.3 The authorized works are the upper LCO Dry Creek Valley ditches, sumps, pumps, LCO Dry Creek rock drain, diversion embankment structure, dual lined head pond with leak detection and recovery system and spillway for flows in excess of Q10 up to Q200 flows, transfer pipeline, two dual lined sedimentation ponds with leak detection and recovery system and spillway for flows in excess of Q10, return channel, decant structure, flocculant addition station, conveyance pipeline, outfall, diffuser, fish barrier and related appurtenances.
- 2.9.4 The location of the facilities from which the discharge originates is Lot 1 District Lot 4588, Kootenay District Plan NEP 21818. PID 019-075-308 and the location of the point of discharge is Lot 1 District Lot 4588, Kootenay District Plan 11279 except plans 572, 12976, NEP70655 and NEP70656.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517


3. SITE PERFORMANCE OBJECTIVES

3.1 SITE PERFORMANCE OBJECTIVES FOR ORDER STATIONS

The following Site Performance Objectives (SPO) are established at the Order Stations. It is expected that SPOs will be maintained during all timeframes shown in the tables or immediately maintained if no date is indicated. Site performance objectives are expressed as monthly average concentrations. The monthly average concentration is defined as the average of all samples collected in a calendar month.

ORDER STATION {Teck ID} (EMS number)	ORDER DESCRIPTION (Teck location description)	PARAMETER	UNIT	Nov. 19, 2014 ³	Dec. 31, 2019 ³	Dec. 31, 2023 ³	Dec. 31, 2025 ³	Dec. 31, 2028 ³
FR4 {GH_FR1} (0200378)	Fording River Downstream of Greenhills Creek	Total Selenium	µg/L	-	63	57	57	57
		Nitrate as N ²	mg/L	20	14.0	11.0	11.0	11.0
		Sulphate	mg/L	429	429	429	429	429
		Dissolved Cadmium ¹	µg/L	0.39	0.39	0.39	0.39	0.39
FR5 {LC_LC5} (200028)	Fording River at the Mouth (Fording River downstream of Line Creek)	Total Selenium	µg/L	-	51	40	40	40
		Nitrate as N ²	mg/L	18	10.0	10.0	10.0	10.0
		Sulphate	mg/L	429	429	429	429	429
		Dissolved Cadmium ¹	µg/L	0.39	0.39	0.39	0.39	0.39
ER1 {GH_ER1} (206661)	Elk River downstream of Greenhills Operations (Upstream of Boivin Creek)	Total Selenium	µg/L	19	19	19	19	19
		Nitrate as N	mg/L	3	3.0	3.0	3.0	3.0
		Sulphate	mg/L	309	309	309	309	309
		Dissolved Cadmium ¹	µg/L	0.24	0.24	0.24	0.24	0.24
ER2 {EV_ER4} (200027)	Elk River from Fording River to Michel Creek (upstream of Grave Creek)	Total Selenium	µg/L	23	23	19	19	19
		Nitrate as N	mg/L	-	4.0	4.0	3.5	3.0
		Sulphate	mg/L	429	429	429	429	429
		Dissolved Cadmium ¹	µg/L	0.24	0.24	0.24	0.24	0.24
ER3 {EV_ER1} (200393)	Elk River downstream of Michel Creek	Total Selenium	µg/L	19	19	19	19	19
		Nitrate as N	mg/L	-	3.0	3.0	3.0	3.0
		Sulphate	mg/L	429	429	429	429	429
		Dissolved Cadmium ¹	µg/L	0.24	0.24	0.24	0.24	0.24
ER4	Elk River at Elko	Total Selenium	µg/L	19	19	19	19	19

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

{RG_ELKORES} (E294312)	Reservoir	Nitrate as N	mg/L	-	3.0	3.0	3.0	3.0
		Sulphate	mg/L	429	429	429	429	429
		Dissolved Cadmium ¹	µg/L	0.24	0.24	0.24	0.24	0.24
LK2 {RG_DSELK} (E300230)	Koocanusa Reservoir south of the Elk River	Total Selenium	µg/L	2	2	2	2	2
		Nitrate as N	mg/L	3	3.0	3.0	3.0	3.0
		Sulphate	mg/L	308	308	308	308	308
		Dissolved Cadmium ¹	µg/L	0.19	0.19	0.19	0.19	0.19

¹ Cadmium SPOs are hardness dependent based on the following formula:
Cd (in µg/L) = $10^{0.83\log_{10}(\text{hardness})-2.53}$ where hardness is in mg/L of CaCO₃

² Nitrate SPOs for FR4 {GH_FR1} as of 2023 and FR5 {LC_LC5} as of 2019 are hardness dependent based on the following formula:

Level 1 benchmark for the Fording River N as mg/L = $10^{1.0003\log_{10}(\text{hardness})-1.52}$ where hardness is in mg/L of CaCO₃

For the purposes of calculating the targets above, hardness is based on the following concentrations:

FR4{GH_FR1}, FR5{LC_LC5}, and ER1{GH_ER1} – 360 mg/L
ER2{EV_ER4}, ER3{EV_ER1}, and ER4{RG_ELKORES} – 200 mg/L
LK2{RG_DSELK} – 150 mg/L

³ Effective Date

3.2 TRIGGERS FOR REASSESSMENT OF LIMITS

In the event that a site performance objective listed in Section 3.1 is exceeded without an exceedance of limits in Section 2, the permittee must:

- Immediately notify the director and KNC of the exceedance;
- Re-sample within 7 days of receiving data to confirm results;
- If the results continue to exceed an SPO, the permittee must re-assess discharge sources and determine appropriate limits for the compliance points detailed in Section 2, or new compliance points based on the re-assessment of discharge sources; and
- Provide to the director and KNC an explanation of the temporary exceedance or an application for an amendment of this permit with new or revised Section 2 limits within 3 months.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



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Mining Authorizations

The director may specify additional monitoring in the event of a continued exceedance.

3.3 **SITE PERFORMANCE OBJECTIVES FOR COMPLIANCE POINTS**

The following Site Performance Objectives (SPOs) are established at the Compliance Points for sites where permit limits have not been specified in Section 2. It is expected that the SPOs will be maintained during all time frames.

COMPLIANCE POINT	SITE PERFORMANCE OBJECTIVE	
GHO Fording River, GHO Elk River, LCO, EVO Michel Creek	Sulphate: BCWQG FWAL ¹ (hardness dependent)	
	WATER HARDNESS² (mg/L)	SULPHATE GUIDELINE (mg/L)
	Very Soft (0-30)	128
	Soft to moderately soft (31-75)	218
	Moderately soft/hard to hard (76-180)	309
	Very hard (181-250)	429
	In addition, the following water quality benchmark as developed for the ABMP will be applied:	
	Very hard (>250)	429
All Compliance Points	Cadmium: $Cd \text{ (in } \mu\text{g/L)} = 10^{\{0.83(\log[\text{hardness}]) - 2.53\}}$ where hardness is in mg/L of CaCO ₃	

¹BC Water Quality Guideline for Freshwater Aquatic Life

²Hardness is in mg/L CaCO₃

Site performance objectives are expressed as monthly average concentrations. The monthly average concentration is defined as the average of the samples collected in a month.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

3.4 SITE PERFORMANCE OBJECTIVES – CALCITE

The permittee must manage calcite levels in streams in Management Units 1, 2, 3, and 4 for streams that are fish bearing, provide fish habitat or flow directly into fish bearing streams and are not scheduled by an Environmental Assessment Certificate or *Mines Act* Permit to be buried. These streams must meet the following Site Performance Objectives:

- 1) By December 31, 2024 $CI_{Conc} \leq 0.50$
- 2) By December 31, 2029 $CI_{total} \leq 0.50$

Where:

CI_{total} :	Calcite Index (total)	=	$CI_{Conc} + CI_{Pres}$
CI_{Conc} :	Calcite Concretion	=	$\frac{\text{Sum of pebble concretion scores}}{\text{Number of pebbles counted}}$
CI_{Pres} :	Calcite Presence	=	$\frac{\text{Number of pebbles with calcite}}{\text{Number of pebbles counted}}$

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

3.5 **LCO DRY CREEK WATER MANAGEMENT AND SITE PERFORMANCE OBJECTIVES**

3.5.1 **LCO DRY CREEK WATER MANAGEMENT PLAN**

The Permittee shall develop and implement an LCO Dry Creek Water Management Plan to achieve Site Performance Objectives while maintaining Minimum Instream Flow Requirements in order to minimize impacts to fish habitat. The Plan must clearly identify proposed works, management actions and contingencies to ensure that the Site Performance Objectives and Minimum Instream Flow Requirements will be met.

3.5.1.1 Approval of the Dry Creek Water Management Plan (dated December 23, 2015) was subject to the following conditions:

- i. Teck will participate in a process with KNC and MOE to establish long-term Site Performance Objectives (SPO) and in-stream Flow Requirements for LCO Dry Creek and provide the required information for review in a timely manner. In this regard, reference is made to the recommended actions found in Table 1 of the MOE memo dated February 10, 2015 (S. Reddekopp to J. Carmody-Fallows). Teck is requested to provide submissions for a decision making framework for this process by September 30, 2015.
- ii. All inflows into the LCO Dry Creek Sediment Ponds must discharge through the return channel back into LCO Dry Creek until December 31, 2019, with the exception of the commissioning period and during scheduled maintenance of the ponds.
- iii. For the purposes of commissioning the sediment ponds (diverting water to fill the ponds) and routine maintenance of the ponds Teck must maintain a minimum instream flow requirement of 20% MAD in LCO Dry Creek.
- iv. Teck will provide the predicted monthly mean SPO constituent concentrations at the SPO location (E295210) and at the mouth of LCO Dry Creek (E288270), for all months up to January 1, 2020. This summary shall be submitted to the Director by May 30, 2015.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- v. Teck will update the December 15, 2014 LCO Nitrate Management Plan to control nitrate releases from the site. The updated Nitrate Management Plan must be implemented and submitted to the Director by June 1, 2015.
- vi. Teck shall take reasonable efforts to collect at least two years of continuous monitoring at the East Tributary of LCO Dry Creek (E288274) and at LCO Dry Creek near its Mouth (E288270) for the purposes of updating the streamflow model. Teck shall develop and implement contingencies to maintain continuous data collection at the LCO Dry Creek Station.

Teck must report on and provide detail demonstrating how mine affected surface and sub-surface water is being captured by the lined head pond and embankment in its next annual report (2015), and provide an estimate of the proportion of mine-affected water (surface and sub-surface) that is not captured by the system in its subsequent annual reports, required initially by OIC Permit 106970, and currently by Permit 107517.

3.5.1.2 Updated LCO Dry Creek Water Management Plan

The updated Dry Creek Water Management Plan will include proposed long-term SPOs and IFRs for LCO Dry Creek along with proposed timing for when they come into effect and a plan and schedule for implementation of active water treatment. The submission date for the updated LCO Dry Creek Water Management Plan is April 30, 2020, with the following conditions:

1) Teck Coal Ltd. shall continue to provide bi-weekly updates to the Director and members of the Structured Decision-Making Process and studies to date until the SDM process is complete. Once the SDM process is completed Teck shall provide updates on water quality results and the status of work in Dry Creek related to the DCWMP to the Director, KNC, and EMLI at a minimum on a quarterly basis between October and April each year and on a monthly basis during bypass of the LCO Dry Creek Sedimentation Ponds via the bypass works.

2) Teck will provide a progress report on the SDM process to the Director on December 15, 2019. The progress report must include:

- a. Summary of the investigations to date;

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- b. Mitigation measures and a schedule for implementation to prevent/reduce selenium bioaccumulation in aquatic species; and
- c. Updated schedule for the SDM process to ensure submission of the updated plan by April 30, 2020.

3) Teck must provide a comprehensive findings report from its investigations and studies regarding the unexpected Se concentrations and unexpected Se bioaccumulation in LCO Dry Creek to the working group and Director in support of the updated LCO Dry Creek Water Management Plan on April 30, 2020.

3.5.2 INSTREAM FLOW REQUIREMENTS

3.5.2.1 Minimum Instream Flow Requirements (IFRs) for LCO Dry Creek will be developed by the Director for the protection of fish habitat. Minimum IFRs shall be developed in consultation with the Permittee. Minimum IFRs for LCO Dry Creek must be met each and every year once waste rock placement in the LCO Dry Creek watershed commences.

3.5.2.2 Interim Instream Flow Requirements

Commencing on January 1, 2020, Interim Instream Flow Requirements for LCO Dry Creek must be met if the Permittee discharges to Fording River through the LCO Dry Creek Water Management System. These Interim Flow Requirements for LCO Dry Creek will be the values outlined below or as otherwise specified by the Director as the result of a process with KNC and MOE to establish long-term SPO and Instream Flow Requirements for LCO Dry Creek.

Aug 1 – Apr 1, 20% Mean Annual Discharge (MAD); for the purpose of summer rearing and overwintering periods

Apr 15 – Apr 30, 50% MAD; for the purpose of natural freshet ramp-up

May 1 – May 14, 100% MAD; for the purpose of braided areas, side channel connectivity

May 15 – June 14, 209% MAD for the purpose of migration and spawning

June 15 – July 14, 105% MAD for the purpose of out-migration

July 15 – July 31, 40% MAD for the purpose of out-migration, incubation

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

3.5.2.3 The Mean Annual Discharges for LCO Dry Creek and the East Tributary are as follows:

LCO Dry Creek – 0.382 m³/s

East Tributary – 0.113 m³/s

3.5.2.4 In the event that the stream flow in the East Tributary drops below East Tributary IFRs, a LCO Dry Creek IFR adjustment shall be calculated using the following equation:

$$(\text{Modified DryCreekIFR}) = (\text{Dry Creek IFR}) * (\text{EastTributaryStreamFlow} / \text{EastTributaryIFR})$$

3.5.3 SITE PERFORMANCE OBJECTIVES

The following Site Performance Objectives (SPOs) are established for LCO Dry Creek, Unnamed Creek and Grace Creek:

Parameter	Objective
Total Selenium	<0.010 mg/L
Total Cadmium	<10 [log 1-0.83*(log 700 – log H)] To a maximum of 0.00038 mg/L (H = site water hardness as CaCO ₃)

3.5.3.1 The requirement to meet SPOs for LCO Dry Creek in Section 3.5.3 is suspended until January 1, 2020. Prior to this date the Director may re-establish or set alternative SPOs as deemed necessary by the Director for the protection of the environment. The permittee may convey water to the Fording River to maintain any established SPOs provided IFRs are maintained.

A plan and schedule for implementation of active water treatment to the Director's satisfaction must be submitted to the Director by December 31, 2019, or earlier if required by the Director.

3.5.3.2 The Director may require the Permittee to develop and implement a plan to achieve the Site Performance Objectives at the mouth of Unnamed Creek (E295213) and/or at Grace Creek upstream of the CP rail tracks (E288275). The plan shall be to the satisfaction of the Director.

3.5.3.3 The Permittee must undertake a comprehensive review of the Site Performance Objectives every three years. The review should consider all available general and site-specific data and science, including but not

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517


limited to: The Elk Valley Area Based Management Plan, B.C. Water Quality Guidelines and standards from other jurisdictions, water quality sampling and Aquatic Effects Monitoring Program results, mixtures toxicity testing results, the Upper Fording River Westslope Cutthroat Trout Population Study, and other special studies and relevant research. Terms of Reference for the first review must be submitted to the Director for approval, by March 31, 2017. The next review of Site Performance Objectives must be submitted to the Director by March 31, 2023. The Director may require an earlier review if significant information becomes available.

3.5. **ESTABLISHING LONG-TERM SITE PERFORMANCE OBJECTIVES AND INSTREAM FLOW REQUIREMENTS**

To support the process for developing long term SPOs and IFRs for LCO Dry Creek, Teck is required to undertake the following:

- i. Completion of an Interim Report for the Tributary Management Plan by July 31, 2017.
- ii. Compilation of all available chronic toxicity and water quality monitoring data through August 31, 2016. The data must be provided to the Director and KNC for review by September 30, 2016.
- iii. Submission of the report to the Director validating the Westslope Cutthroat Trout Habitat Suitability Index Model as required by Condition 13 of EAC #13-02 by August 31, 2016.
- iv. Submission of the instream flow needs study required by Condition 14 of EAC#13-02 but August 31, 2017. In addition, Teck must include a review of frequency analysis, using intensity-duration-frequency curves, to ensure appropriateness and applicability.
- v. Submission of an updated streamflow model (based on the UBC Watershed Model) using all available data to September 30, 2016.
- vi. Submission of an options analysis on the SPOs and IFRs and the DCWMP by October 30, 2016, which shall include the following:
 - a. An evaluation of the resultant flow impacts to LCO Dry Creek under differing SOP values ranging from the original SPO in OIC 106970 (10 ug/L) to that proposed in the 2014 DCWMP for the date December 23, 2024 (70 ug/L), and timelines for when conveyance might be required to meet the specific SPO.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- b. An evaluation of other potential mitigations explored by Teck to meet both instream flow requirements and site performance objectives.
 - c. Proposed triggers for construction of active water treatment, conveyance or other necessary mitigations.
- vii. Teck shall provide progress reports to MOE and KNC on July 30, 2015, and January 31, 2016, regarding the above requirements.
- viii. An additional progress report regarding the requirements of the LCO Dry Creek Water Management Plan approval must be made to the Director and to KNC by November 30, 2016.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

4. **TRIBUTARY EVALUATION AND MANAGEMENT**

The permittee must develop and implement a phased study design for a Tributary Evaluation Program and develop and implement a Tributary Management Plan. The Tributary Evaluation Program and the Tributary Management Plan must include all tributaries affected or potentially influenced by the permittee's current operations and future development plans in Management Units 1, 2, 3, and 4, as defined in the Elk Valley Water Quality Plan.

The Tributary Evaluation Program is intended to evaluate the ecological value of tributaries to the Elk and Fording Rivers to support identification of tributaries that play a significant role in supporting the health of the ecosystem as a whole. The Tributary Evaluation Program must include the following elements:

- i. Inventory of tributaries to the Elk and Fording Rivers that are located in Management Units 1, 2, 3, and 4 that are affected or potentially influenced by the permittee's current and future development plans;
- ii. Maps of Management Units 1, 2, 3, and 4 showing the locations of the tributaries of the Elk and Fording Rivers, and identifying the tributaries that are affected or potentially influenced by the permittee's current and future development plans;
- iii. Collation of existing and readily available data and information on each tributary, including surface-water chemistry, surface-water toxicity, sediment chemistry, sediment-toxicity, calcification, flow, habitat value ranking, benthic invertebrate community structure, and habitat use by fish and/or sensitive aquatic dependent wildlife (i.e., water birds);
- iv. Evaluation of historical (i.e. conditions relevant to the 1980 timeframe, where available) and current habitat value, based on surface-water quality, sediment quality, extent of calcification, flow, amount of habitat available, habitat types, physical features, connectivity to fish habitat, status of riparian habitat, and habitat use by fish and sensitive aquatic dependent wildlife species;
- v. Evaluation of the potential for rehabilitation of aquatic and riparian habitat and potential for improvement of water quality conditions; and
- vi. Prioritization of each tributary for ongoing protection and/or restoration based on the evaluation of current ecological value, potential for rehabilitation, and potential to contribute to the objectives of the EVWQP.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

The purpose of this evaluation is to provide context for the development of specific management objectives for tributaries included in the Tributary Management Plan. As the Tributary Evaluation Program will also provide essential information for assessing the potential effects of planned mine expansions and new projects, the components of the program that relate to the upper Fording River and the Michel Creek watershed should be completed on a priority basis as part of the phased study design.

Following the evaluation of the tributaries, the permittee must develop and implement a Tributary Management Plan. The Tributary Management Plan is intended to incorporate protection and rehabilitation goals for tributaries that will support achieving the area-based objectives of the Elk Valley Water Quality Plan. In development of the Tributary Management Plan, those tributaries that are not impacted by mining activities, that provide relatively high habitat value, and/or support ongoing habitat use by fish and sensitive aquatic dependent wildlife (i.e. directly or indirectly through food production) shall be identified as the highest priority tributaries for permanent protection. Those tributaries that have been impacted by mining, provide or have the potential to provide relatively high habitat value, and/or support or could support habitat use by fish and sensitive aquatic dependent wildlife shall be identified as the highest priority tributaries for restoration/rehabilitation. The Tributary Management Plan will consider the permittee's future mine development plans. The scope of the Tributary Management Plan excludes tributaries that have been permanently removed or severely altered (e.g., covered by waste spoils or other mine infrastructure or dewatered) by mining activities within the permittee's current mine permit boundaries. Loss of habitat for such tributaries is governed by requirements under the Federal *Fisheries Act* and the provincial mitigation policy.

The Tributary Evaluation Program and Tributary Management Plan will complement the Elk Valley Water Quality Plan and clearly detail any proposed management of water quality conditions, flows and ecological values within the tributaries affected or influenced by the permittee's current operations and planned developments in Management Units 1, 2, 3, and 4, as defined in the Elk Valley Water Quality Plan.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

The following development and implementation timelines apply:

- 1) A Phased Study Design for the Tributary Evaluation Program, including a listing of all tributaries to be evaluated, must be submitted to the EMC by May 1, 2015.
- 2) The Phased Study Design for the Tributary Evaluation Program must be submitted for acceptance to the director by May 31, 2015.
- 3) The Terms of Reference for the Tributary Management Plan must be submitted to the EMC by March 31, 2016.
- 4) Data collected during the Tributary Evaluation Program for current ecological value of tributaries within Management Units 1, 2, 3 and 4 must be compiled into a written report and submitted to the EMC by March 31, 2016.
- 5) Analysis and interpretation of Tributary Evaluation Program data, assessment of potential for rehabilitation and/or mitigation, and prioritization of tributaries for potential future habitat rehabilitation must be compiled into a written interim report and submitted to the EMC by August 31, 2016.
- 6) Interim Tributary Management Plan report must be submitted to the EMC by July 31, 2017. The Tributary Management Plan must be submitted for acceptance to the director by December 31, 2017. The Tributary Management Plan must be implemented by March 1, 2018.
- 7) An updated Tributary Management Plan must be submitted for acceptance to the director by July 31, 2020. Thereafter, the Plan must be updated and submitted for acceptance to the director by July 31st every three years. Updated Tributary Management Plans must be prepared in consultation with the EMC. The updates shall, at a minimum, incorporate any changes to the permittee's current and future development plans.
- 8) The accepted Tributary Management Plan must be implemented, and an annual implementation report must be submitted to the director and to the EMC by January 31st of each year. The annual report must describe implementation activities undertaken in tributaries in the Designated Area including those under the Tributary Management Plan itself, other legal requirements and other supporting programs, in the previous 12 months to rehabilitate impacted tributaries and protect high value, unimpacted tributaries.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

5. CONTAMINANT MANAGEMENT PLANS

5.1 CALCITE MANAGEMENT PLAN

The permittee must update and submit the Calcite Management Plan to the satisfaction of the director, as outlined in Chapter 7 of the Elk Valley Water Quality Plan, by July 31, 2016 and every three years thereafter. The Calcite Management Plan must include a list of streams that according to Section 3.4 must meet the Calcite Site Performance Objectives and provide a schedule for implementation of mitigation measures. Mitigation measures must be implemented according to the schedule.

Refer to Appendix 5 for calcite treatment facility operational requirements.

5.1.1 Antiscalant Effects Assessment

The permittee must develop and implement a study design for assessing the cumulative effects of regional antiscalant application in parallel to work being undertaken by the permittee in accordance with Sections 3.4 and 5.1. The study design must be reviewed by the EMC prior to submission to the director. The assessment must include the permittee's operating calcite treatment facilities and future planned calcite treatment facilities as outlined within the 2022 Calcite Management Plan.

The purpose of this assessment is to evaluate the potential effects of planned calcite treatment projects on a regional scale. The assessment must address the potential toxic effects of exposure of ecological and human receptors to antiscalant addition as well as to modelled concentrations of metal constituents typically attenuated during calcite formation. Should the assessment demonstrate that the planned calcite treatment projects represent an unacceptable level of risk to the environment or human health, the director may require submission of an interim Calcite Management Plan.

The following timelines apply:

- i. A study design for the Antiscalant Effects Assessment must be submitted to the director, for approval, by April 20, 2022.
- ii. Analysis and an integrated interpretation of Antiscalant Effects Assessment data in the Elk River Watershed and evaluation of the potential for antiscalant cumulative effects must be compiled

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

into a written report and submitted to the director and the EMC by March 31, 2023. The assessment must be accompanied by recommendations from a Qualified Professional regarding whether any changes or updates are needed to the most recent version of the Calcite Management Plan.

5.2 NICKEL MANAGEMENT

5.2.1 Development of Nickel Benchmark

The permittee must develop a nickel benchmark derivation workplan and submit it to the director for approval by August 31, 2021. The workplan must incorporate feedback from the EMC and include proposed methodologies and timelines for the derivation of a nickel benchmark that could be applied in the receiving environment of the Elk Valley.

Once the final nickel benchmark is derived, the director may require additional mitigation to be implemented.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

5.2.2 ELKVIEW OPERATIONS

5.2.2.1 Trigger Response Plan for Nickel

The permittee must develop and implement a Trigger Response Plan (TRP) for nickel. The TRP must be submitted to the director for approval 30 days prior to the end of the commissioning period for the EVO SRF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes to the approved TRP. The TRP must describe the actions to be taken if total nickel concentrations in the effluent exceed an initial trigger value of 36 ug/L, calculated as a quarterly (13-week) rolling average at the Effluent Retention Pond Outlet (F2_BPO, E321812), when the SRF is discharging to Erickson Creek.

The purpose of the TRP is to ensure that procedures to manage nickel concentrations in the effluent are implemented in a timely manner to minimize risks associated with elevated nickel concentrations in the receiving environment of Erickson Creek. The TRP procedures must include, but not be limited to, an increase in effluent and/ or receiving environment monitoring to confirm exceedances of triggers, specific management actions to be implemented where trigger exceedances are confirmed, and a schedule for implementation of the management actions.

The permittee must review and update the TRP within 9 months of the submission of the final nickel benchmark to the director. The updated TRP must be submitted to the director and must include consideration of:

- i. The final nickel benchmark as per Section 5.2.1,
- ii. Results from the Elkview Operations Local Aquatic Effects Monitoring Program as per Section 8.3.5, and
- iii. any other relevant plans, data or information.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

5.3 **NITROGEN SOURCE CONTROL PLAN**

The permittee must develop a Nitrogen Source Control Plan that applies to operations at each of the Teck Coal Mine Sites in the Designated Area prepared by a Qualified Professional. The Nitrogen Source Control Plan must be submitted to the director by May 31, 2021. The plan must include, at a minimum, the following:

- i. A discussion of the current state of understanding of the physical and biogeochemical processes occurring within and downgradient of waste rock spoils as a result of loss of nitrogen species to the environment from blasting practices.
- ii. A discussion of nitrogen speciation, interaction effects with other Parameters of Concern, changes to concentrations over time, etc.
- iii. A description of management strategies that have been and will be implemented to prevent the loss of nitrogen species to the environment. Each nitrogen management strategy must be coupled with measurable key performance indicators (KPIs) and/or management performance metrics, with timelines for achievement, that will allow the success of each management strategy to be measured.

The submitted Nitrogen Source Control Plan must be implemented and any updates to the plan must be submitted to the director within 30 days of adoption.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

6. GENERAL REQUIREMENTS

6.1 MAINTENANCE OF WORKS AND EMERGENCY PROCEDURES

The permittee must inspect the authorized works regularly and maintain them in good working order. In the event of a condition or emergency which prevents effective operation of the authorized works, leads to unauthorized discharge, or results in a permit exceedance, the permittee must:

- i. Comply with all applicable statutory requirements, including the Spill Reporting Regulation;
- ii. Immediately contact the director or an officer designated by the director by e-mail and/or telephone;
- iii. Take immediate appropriate remedial action for the prevention or mitigation of pollution; and
- iv. Submit written documentation of any malfunction or emergency condition. The report must include all the corrective and preventative actions that will be taken, a schedule of implementation of actions and the date the findings as to the cause of the incident will be reported to the director and KNC. This information must be submitted with the next quarterly report required in Section 9 unless otherwise required by the director.

During an emergency event, the director may suspend conditions under this permit where the emergency event will prevent compliance with a requirement of this permit.

During and/or after the emergency event or condition, the permittee must conduct appropriate sampling and analysis of discharges, which may be more stringent than the monitoring requirements of this permit and/or applicable statutory requirements. As the results of such sampling become available, the permittee must provide the results to the director or a designated officer. The director may require additional monitoring or reporting at any time by specifying such in writing to the permittee.

The director may specify contingency actions to be implemented to protect human health and the environment while authorized works and/or standard operating procedures are being restored.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

6.2 EFFLUENT NON-TOXICITY

- 6.2.1 Effluent is not acutely toxic if it does not cause greater than 50% mortality in 96 hr Rainbow Trout (*Oncorhynchus mykiss*) single concentration toxicity tests (EPS 1/RM/13 2nd edition, December 2000) or greater than 50% mortality in 48 hr *Daphnia magna* single concentration toxicity tests (EPS 1/RM/14 2nd edition, December 2000).
- 6.2.2 Where acute toxicity testing is required at discharge monitoring sites in Appendix 2 Tables 9 through 22, effluent must always not be acutely toxic, as per Section 6.2.1.

6.3 CONTROLLED BYPASSES

Bypass of the authorized works, except for the two (2) LCO Dry Creek Sedimentation Ponds seasonally during non-freshet flows as per Section 2.8.3, calcite treatment facilities as per Appendix Section 5A3 and selenium and nitrate treatment facilities as per Appendix Sections 4C3.5 and 4D2.3, is prohibited unless the prior approval of the director is obtained and confirmed in writing. The director may specify conditions to address the bypass.

6.4 QUALIFIED PROFESSIONAL

A qualified professional is defined as follows:

"Qualified Professional" means an applied scientist or technologist specializing in an applied science or technology applicable to the duty or function, including, but not limited to agrology, biology, chemistry, engineering, geology or hydrogeology and who:

- i. is registered with the appropriate professional organization, is acting under that organization's code of ethics and is subject to disciplinary action by that organization, and
- ii. through suitable education, experience, accreditation and/or knowledge, may be reasonably relied on to provide advice within their area of expertise.

All documents submitted to the director by a Qualified Professional must be signed by the author(s).

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

6.5 ENVIRONMENTAL EMERGENCY RESPONSE PLAN

The permittee must maintain an Environmental Emergency Response Plan which includes effective procedures for responding to all probable environmental emergencies associated with the Teck Coal operations and mine site areas, including the suspension of discharge of effluent(s) where appropriate, if required. The permittee must keep this plan up to date and provide the director with any updates to this plan within 30 days of adoption of the plan update.

The director may require periodic review of the response plan, and/or a report on any emergency event associated with the mine operation or occurring at the mine site.

6.5.1 The Emergency Response Plan shall at a minimum include:

- i. Identification of Environmental Aspects as defined by the ISO 14001 Environmental Management System Standards that pose a risk to the environment or public safety;
- ii. An evaluation of the identified environmental aspects including a fate and effects assessment where applicable;
- iii. Maps identifying areas of high environmental sensitivity around the mine sites including along the transportation corridors, and areas downstream of water-crossings where spilled materials can reasonably be anticipated to impact;
- iv. Site specific spill response tactics, including the required training and resources to implement those tactics for each of the identified materials or risks during an emergency event;
- v. Requirements and procedures for spill reporting and/or emergency notification to various levels of government, including the KNC; and
- vi. Procedure for establishing formal interagency communication for the duration of the emergency and clean-up as necessary.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

6.5.2 The permittee must maintain an Environmental Emergency Response Plan and ensure:

- i. Adequate equipment caches are available at each operation, at a minimum, to enable timely and effective response to the identified highly sensitive areas and implementation of the plan;
- ii. Identify, train and have available a sufficient number of emergency responders to effectively and efficiently respond and implement the identified emergency response tactics;
- iii. Conduct regularly scheduled emergency response drills and exercises to test and refine the plan; and
- iv. Participate in efforts to harmonize spill response kits and plans with other industrial operators and municipalities.

6.6 **PUBLIC NOTIFICATION REGARDING POTABLE WATER USE IN ELK VALLEY**

The permittee must provide annual notification to all current water users (specifically surface and shallow groundwater users along the Fording and Elk Rivers) downstream of the Teck Operations, where impacts from mining are causing exceedances of the British Columbia Drinking Water Quality Guidelines. The notification must:

- i. Advise current water users in the Elk Valley of the risks for drinking water sources to exceed drinking water guidelines
- ii. Remind all water users to have their source water sources tested to identify if treatment is required prior to drinking;
- iii. Have the same information accessible and maintained on the Internet; and
- iv. Annually by March 31, submit a written report to the director describing compliance with the requirements of this section for the previous year.

A draft of the notification shall be submitted to Interior Health (email: hbe@interiorhealth.ca) and to the director 30 days prior to distribution. This notification requirement shall continue until such time as water quality in the affected areas improves such that BC Drinking Water Quality Guidelines are achieved for mining-related Parameters of Concern determined through the Regional Groundwater Monitoring Program.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

7. ABMP COMMITMENTS

The following section identifies specific commitments made by the permittee in the Elk Valley Area Based Management Plan.

The permittee must aggressively pursue all viable approaches for reducing contaminant loadings to the environment and implement in a timely manner. Treatment approaches include passive and active water treatment.

7.1 TREATMENT

7.1.1 ACTIVE WATER TREATMENT FACILITIES

The permittee must design, construct and operate the following active water treatment facilities (AWTF) or alternative water treatment technology as approved by the director, by the date shown. The permittee must employ best achievable technology in the development of these treatment facilities. Phosphorus treatment must be included if necessary, to ensure BC Water Quality Guidelines for chlorophyll -a for freshwater aquatic life in streams is met.

TREATMENT FACILITY	TREATMENT SCOPE	APPROXIMATE CAPACITY OF AWTF	OPERATIONAL DATE
Fording River South	Cataract, Swift, Kilmarnock Creeks	20,000 m ³ /day	December 31, 2018
Elkview Phase I*	Bodie, Gate, Erickson Creeks	30,000 m ³ /day	December 31, 2020
Fording River North	Clode Creek, North Spoil, Swift Pit	15,000 m ³ /day	December 31, 2022
Elkview Phase II	Erickson	20,000 m ³ /day	December 31, 2024
Greenhills	GHO West Spoil (Thompson, Leask, Wolfram), Greenhills Creek	7,500 m ³ /day	December 31, 2026
Fording River North Phase II	Swift Pit Discharge	15,000 m ³ /day	December 31, 2030

*Elkview Operations SRF Phase 2 replaces Elkview Phase I

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Notwithstanding the above requirements to construct and operate active water treatment facilities, the permittee must ensure that all necessary active water treatment works or alternative water quality mitigation works are designed, constructed and operated in sufficient time and at sufficient capacity to meet targets and timeframes for water quality consistent with the ABMP.

7.2 **RESEARCH AND TECHNOLOGY DEVELOPMENT**

7.2.1 RESEARCH ACTIVITIES

- i. The permittee shall conduct a research and technology development program aimed at:
 - a) Identifying, evaluating, and verifying measures to minimize the release of selenium, nitrate, sulphate, cadmium, calcite, and any other Parameters of Concern designated by the director; and
 - b) Developing mitigation strategies to improve the management of water quality and calcite within the Designated Area.
- ii. Research and technology development activities shall specifically include research to identify, evaluate, and validate measures to reduce the reliance on long term active water treatment.
- iii. Research areas shall include, but not be limited to, the following topics:
 - a) geochemical release mechanisms, release rates and relationships between factors that influence contaminant release;
 - b) saturated and unsaturated flow mechanisms in waste piles;
 - c) mine waste rock management and dump design alternatives;
 - d) cover systems including soil and vegetative covers, complex soil covers and geomembranes;
 - e) water capture, diversion and conveyance systems;
 - f) active and semi-passive water treatment, including partially saturated waste rock fills;
 - g) water treatment residuals management;
 - h) treatment strategies for phosphorus reduction;
 - i) treatment strategies for sulphate and cadmium reduction, if needed in the future;

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- j) nitrate reduction through treatment and improved blasting practices; and,
 - k) predictive tools and treatment/management technologies for calcite formation.
- iv. All on-site field trials for mitigation strategies and on-site piloting work for water treatment shall be discussed with the director to determine whether they will require permit amendments before proceeding.

7.2.2 REPORTING

The permittee must submit an annual Research and Technology Development Progress Report by March 31st of each year that contains:

- i. A detailed rationalization of the overall research program including reasons why specific research areas are/are not being investigated in a given year;
- ii. Detailed information on research objectives, study designs, data collected, results and interpretation, and plans for future research and technology development;
- iii. An evaluation of the technologies relative to their potential for implementation at specific locations within the Designated Area;
- iv. A timeframe for implementation of technologies at pilot and at full-scales and for integration into the Adaptive Management Plan; and,
- v. Portions of the report that contain proprietary information must be marked "Confidential – Proprietary." Release of information is subject to the Freedom and Information Privacy Act.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

8. MONITORING REQUIREMENTS

The director may alter the monitoring and reporting requirements in this permit as needed. The need for changes to the programs will be based on results submitted as well as any other information obtained by the director in connection with the discharges.

8.1 DISCHARGE AND RECEIVING ENVIRONMENT MONITORING PROGRAMS

The permittee must sample the parameters at the sampling sites at the specific frequencies as defined in Appendix 2 Tables 9 through 22. The permittee must sample flow at the sites listed and at the frequency recommended in Appendix B in the approved Regional Surface Flow Monitoring Plan. The discharge and receiving environment water sampling sites are located approximately as shown in Appendix 1.

8.1.1 SAMPLING SITES

Discharge and receiving environment sample collection locations are described and numerically identified in Tables 1 through 8.

TABLE 1: COMPLIANCE POINTS SAMPLING LOCATIONS (APPENDIX 1C)

EMS #	TECK IDENTIFIER	SITE	SITE DESCRIPTION
E223753	FR_FRABCH	FRO	Fording River, approximately 100 m upstream of Chauncey Creek
0200378	GH_FR1	GHO	Fording River, approximately 205 m downstream of Greenhills Creek
E300090	GH_ERC	GHO	Elk River, approximately 220 m downstream of Thompson Creek
E297110	LC_LCDSSLCC	LCO	Line Creek immediately downstream of South Line Creek Confluence (approximately 1500 m downstream of the WLC WTP outfall)
E102682	EV_HC1	EVO	Harmer Spillway
E300091	EV_MC2	EVO	Michel Creek at Highway 3 Bridge
E258937	CM_MC2	CMO	Michel Creek, approximately 50m upstream of Andy Goode Creek
E291569	WL_BFWB_OUT_SP21	LCO (Effluent)	WLC WTP Outfall (Effluent)

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

TABLE 2: ORDER STATIONS SAMPLING LOCATIONS (APPENDIX 1D AND 1E)

<i>EMS #</i>	<i>ORDER STATION (TECK IDENTIFIER)</i>	<i>SITE DESCRIPTION</i>
0200378	FR4 (GH FR1)	Fording River Downstream of Greenhills Creek
0200028	FR5 (LC LC5)	Fording River downstream of Line Creek
E206661	ER1 (GH ER1)	Elk River upstream of Boivin Creek
0200027	ER2 (EV_ER4)	Elk River upstream of Grave Creek (from Fording River to Michel Creek)
0200393	ER3 (EV_ER1)	Elk River Downstream of Michel Creek
E294312	ER4 (RG ELKORES)	Elk River at Elko Reservoir
E300230	LK2 (RG DSELK)	Koocanusa Reservoir south of the Elk River

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

TABLE 3: FORDING RIVER OPERATION DISCHARGE, RECEIVING ENVIRONMENT, AND OTHER SAMPLE LOCATIONS (APPENDIX 1F)

<i>EMS #</i>	<i>TECK IDENTIFIER</i>	<i>SITE DESCRIPTION</i>
E102475	FR TP1	Tailings Slurry to North Tailings Pond
E206660	FR TP3	Tailings Slurry to South Tailings Pond
E102476	FR NL1	North Loop Settling Pond Decant to the Fording River
E102478	FR MS1	Maintenance and Services Settling Pond Decant
E102480	FR EC1	Eagle Settling Pond Decant
E102481	FR CC1	Clode Settling Pond Decant
E208394	FR SKP1	South Kilmarnock Settling Pond Decant - Phase 1
E208395	FR SKP2	South Kilmarnock Settling Pond Decant- Phase 2
E216781	FR HP1	Henretta Pit Effluent into diversion culvert
E217403	FR 3PIT	Swift Pit Effluent to Fording River
E261897	FR SP1	Smith Ponds Decant
E304835	FR LP1	Liverpool Sed. Pond Decant
E304750	FR PP1	Post Sed. Pond Decant
0200252	FR KC1	Kilmarnock Cr. D/S of Rock Drain
E306924	FR LMP1	Lake Mountain Sediment Pond Decant
0200201	FR FR2	Fording River upstream of Kilmarnock Creek
0200251	FR FR1	Fording River downstream of Henretta
E216777	FR UFR1	Fording River upstream of Henretta
E216778	FR HC1	Henretta Cr. upstream of Fording River
E300096	FR HC3	Henretta Creek upstream of McQuarrie Creek
E300097	FR FRRD	Fording River near Fording River Road
E300071	FR_FRCPI	Fording River, approximately 525 m downstream of Cataract Creek
E320693	FR FR3	Fording River upstream of FRO AWTF-S Outfall Structure
E320694	FR_SCOUT	Discharge from the pipeline conveying the combined, untreated mine-influenced flow from Swift-Cataract dosed with antiscalant, and Swift Clean Water Diversion at the FRO AWTF-S Outfall Structure
E320695	FR_SCOUTDS	Fording River downstream (approx. 100 m) of FRO AWTF-S Outfall Structure
E325311	FR FWP1	Floodplain Widening Sediment Pond Decant
E325312	FR FWP1H	Floodplain Widening Sediment Pond in-pond sample location

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

TABLE 4: GREENHILLS OPERATION DISCHARGE AND RECEIVING ENVIRONMENT SAMPLE LOCATIONS (APPENDIX 1G)

EMS #	TECK IDENTIFIER	SITE DESCRIPTION
E287438	GH TPS	Tailings Pond Water
E102709	GH GH1	Greenhills Creek Sed. Pond Decant
E207436	GH TC2	Thompson Creek Sed. Pond Decant
0200385	GH PC1	Porter Creek Sed. Pond Decant
E257795	GH WC1	Wolfram Creek Sed. Pond Decant
E257796	GH LC1	Leask Creek Sed. Pond Decant
E207437	GH RLP	Rail Loop Sed. Pond Decant
0200388	GH MC1	Mickelson Creek at LRP Road
E287433	GH WADE	Wade Creek at LRP Road
E305855	GH WOLF SP1	Wolf Creek Sed. Pond Decant
E305854	GH WILLOW SP1	Willow Creek Sed. Pond Decant
0200389	GH ER2	Elk River upstream of Greenhills Operation
E102714	GH TC1	Thompson Creek at LRP Road
E287432	GH COUGAR	Cougar Creek at LRP Road
E287437	GH BR F	Branch F at LRP Road
E305875	GH NNC	No Name Creek
E305876	GH ER1A	Elk River Side Channel D/S Wolfram Creek
E305877	GH ERSC2	Elk River D/S of Thompson Creek
E305878	GH ERSC4	Elk River Side Channel U/S Wolfram Creek

TABLE 5: LINE CREEK OPERATION PHASE I DISCHARGE AND RECEIVING ENVIRONMENT SAMPLE LOCATIONS (APPENDIX 1H)

EMS #	TECK IDENTIFIER	SITE DESCRIPTION
E221268	LC LC9	No Name Cr. Pond Decant
E216144	LC LC7	MSA North Ponds Effluent to Line Creek
E304613	LC LC7DSTF	MSA North Ponds Effluent to Line Creek Alternate
E219411	LC LC8	Contingency Treatment System Effluent to Line Creek
E293371	WL WLCI SP01	WLC WTP West Line Creek (Influent)
E293370	WL LCI SP02	WLC WTP Line Creek (Influent)
200044	LC LC4	Line Creek u/s of Process Plant (~5,550 m d/s of WLC WTP outfall)
200337	LC LC3	Line Creek d/s of West Line Creek (~200 m d/s of WLC WTP Outfall)
200335	LC LC2	Line Creek upstream of Rock Drain
E293369	LC LCUSWLC	Line Creek u/s of West Line Creek, below rock drain (~ 140 m u/s of WLC WTP outfall)
E216142	LC LC1	Line Creek upstream MSA North Pit
E282149	LC SLC	South Line Creek West Side of Main Rock Drain
E261958	LC WLC	West Line Creek
E223240	LC LC12	North Horseshoe Creek Near Mouth

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

**TABLE 6: LINE CREEK OPERATION PHASE II DISCHARGE AND
RECEIVING ENVIRONMENT SAMPLE LOCATIONS (APPENDIX
1H)**

<i>EMS #</i>	<i>TECK IDENTIFIER</i>	<i>SITE DESCRIPTION</i>
E295211	LC_SPDC	LCO Dry Creek Sedimentation Ponds effluent to Dry Creek
E295231	LC_SPFR	LCO Dry Creek Sedimentation Ponds effluent to Fording River
E295313	LC_DSSW	Diversion Structure Spillway
E295314	LC_SP1SW	Sedimentation Pond 1 Spillway
E295315	LC_SP2SW	Sedimentation Pond 2 Spillway
E295316	LC_SP3SW	Sedimentation Pond 3 Spillway
E288274	LC_DCEF	East Tributary of LCO Dry Creek
E288273	LC_DC3	LCO Dry Creek upstream of East Tributary Creek
E295210	LC_DCDS	LCO Dry Creek downstream of sedimentation ponds
E288270	LC_DC1	LCO Dry Creek near mouth (at bridge)
E295213	LC_UC	Unnamed Creek
E288275	LC_GRCK	Grace Creek upstream of the CP rail tracks
E295232	LC_FRUS	Fording River 100m upstream of conveyance outfall
E288271	LC_FRUSDC	Fording River upstream of LCO Dry Creek, 100m downstream of conveyance outfall
E288272	LC_FRDSDC	Fording River downstream of LCO Dry Creek
E295214	RG_CH1	Chauncey Creek

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

TABLE 7: ELKVIEW OPERATION DISCHARGE, RECEIVING ENVIRONMENT AND OTHER SAMPLE LOCATIONS (APPENDIX 1I)

<i>EMS #</i>	<i>TECK IDENTIFIER</i>	<i>SITE DESCRIPTION</i>
E296310	EV_GH1	GEHO Line Valve at Plant (West Fork Tailings Effluent)
0200097	EV_EC1	Erickson Creek at Mouth
E296311	EV_SP1	South Pit Creek Sed. Pond Decant
E208057	EV_MG1	Milligan Creek Sed. Pond Decant
E206231	EV_GT1	Gate Creek Sed. Pond Decant
E102685	EV_BC1	Bodie Creek Sed. Pond Decant
E102679	EV_OC1	Otto Creek 70 m upstream of the Elk River
E208043	EV_GC2	Goddard Creek Sed. Pond Decant
E258135	EV_LC1	Lindsay Creek Infiltration Pond
E298590	EV_DC1	Dry Creek Sed. Pond Decant
E102681	EV_SM1	6 Mile Creek Sed. Pond Decant
E302170	EV_AQ6	Aqueduct Control Structure to Aqueduct Creek
0200203	EV_MC3	Michel Creek upstream of Erickson Creek
0200111	EV_ER2	Elk River upstream of Michel Creek
E298592	EV_BLM2	Balmer Creek at CFI Road
E298591	EV_FC1	Fennelon Creek at CFI Road
E298594	EV_SPR2	Spring Creek at Mouth
E298593	EV_TC1	Thresher Creek at Milligan Road

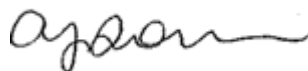
TABLE 8: COAL MOUNTAIN OPERATION DISCHARGE AND RECEIVING ENVIRONMENT SAMPLE LOCATIONS (APPENDIX 1J)

<i>EMS #</i>	<i>TECK IDENTIFIER</i>	<i>SITE DESCRIPTION</i>
E102488	CM_SPD	Decant Discharge from Main Interceptor Sedimentation Ponds to Corbin Creek
E206438	CM_CCPD	Decant Discharge from Corbin Sedimentation Pond to Corbin Creek
E298733	CM_PC2	Pengelly Channel to Corbin Creek
E298734	CM_SOW	Sowchuck Sump
E258175	CM_MC1	Michel Creek upstream of Operations
E200209	CM_CC1	Corbin Creek near Confluence with Michel Creek

TABLE 9: KOOCANUSA RESERVOIR RECEIVING ENVIRONMENT SAMPLE LOCATIONS (APPENDIX 1E)

<i>EMS #</i>	<i>TECK IDENTIFIER</i>	<i>SITE DESCRIPTION</i>
E300095	RG_KERRRD	Koocanusa Reservoir downstream of Kikkoman Creek
E300092	RG_GRASMERE	Koocanusa Reservoir west of Grasmere
E300093	RG_USGOLD	Koocanusa Reservoir upstream of Gold Creek
E300094	RG_BORDER	Koocanusa Reservoir upstream of the Canada/US border

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

8.1.2 SAMPLING AND ANALYTICAL PROCEDURES

The following sections apply to the monitoring required as per Section 8 of this permit.

8.1.2.1 SAMPLING PROCEDURES & LAB ANALYSES

Sampling is to be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples," or by suitable alternative procedures as authorized by the director.

A copy of the manual may be viewed online at:
http://www.env.gov.bc.ca/epd/wamr/labsys/field_man_03.html

Analyses are to be carried out in accordance with procedures described in the most recent edition of the "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air," or by suitable alternative procedures as authorized by the director.

A copy of the manual may be viewed online at:
http://www.env.gov.bc.ca/epd/wamr/labsys/lab_meth_manual.html


Copies of the above manual(s) may be purchased from the Queen's Printer Publications Centre, P. O. Box 9452, Stn. Prov. Gov't. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409).

Copies of the manuals are also available at all Environmental Protection offices.

8.1.2.1.1 *Minimum Detection Limit*

Minimum analytical detection limits for each parameter required by this permit must be suitable for comparison with the applicable standards listed in the most recent Approved and Working Water Quality Guidelines prepared by the ministry or other applicable limits acceptable to the director.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

8.1.2.1.2 *Quality Assurance/Quality Control (QA/QC) Program*

The permittee must implement a Quality Assurance and Quality Control plan in accordance with the Environmental Data Quality Assurance Regulation and guidance provided in the “British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emissions, Water, Wastewater, Soil, Sediment, and Biological Samples”, and “British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air.” All data analyses required to be submitted by this permit must be conducted by an analytical laboratory(ies) registered under the inter-laboratory comparison program as identified in the Environmental Data Quality Assurance Regulation unless otherwise instructed by the director.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

8.1.2.2 FLOW MONITORING

8.1.2.2.1 *Flow Calculation*

Flow calculation methods for receiving streams or creeks where flow measurements are not taken must be based on a regional hydrological evaluation and recommendations made by a qualified professional. Appropriate current and historical stream gauging data should be utilized. Methods must be updated at a frequency and in a manner recommended by a qualified professional and acceptable to the director.

For the purposes of permit fee calculation, mean annual flows for the previous calendar year will be used.

8.1.2.2.2 *Flow Measurement*

Flow monitoring programs must be designed and implemented, and flow measurements conducted, with the intent of achieving acceptable data quality standards as defined in the approved Regional Surface Flow Monitoring Plan.

In order to appropriately determine data quality, flow measurement must be conducted in accordance with the Manual of British Columbia Hydrometric Standards (RISC, 2018), or by suitable alternative procedures as authorized by the director. The "British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples" may also be used in conjunction with the Hydrometric Standards to provide more detailed guidance on monitoring of flow using rated structures, or as a reference for alternative monitoring methods.

8.1.2.2.3 *Metadata Summary*

The permittee must compile flow monitoring station metadata for all mine sites and Elk Valley monitoring locations, including:

- i. Station lat/long, elevation, basin area and median basin elevation;
- ii. Measurement method;
- iii. Measurement frequency;

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- iv. Rating curve established, and stability of rating curve;
- v. Identify where benchmarks and staff gauge are installed;
- vi. Identify where flow is measured and where it is calculated (by summing/subtracting/scaling other gauged flows);
- vii. Identify where data is collected to meet a permit condition;
- viii. Identify qualitatively where station information is considered representative of “mine affected” or “natural” catchments;
- ix. Targeted RISC data grade as defined in the approved Regional Surface Flow Monitoring Plan;
- x. identify the percent contribution of mean annual flow to nearest downstream order station listed;
- xi. identify qualitatively where station information likely representative of total watershed yield, and if not, list the known issues affecting the ability of the station to represent total watershed yield;
- xii. a general site description of each hydrometric monitoring station including a photo(s) of the station; and,
- xiii. The permittee must submit an updated Metadata Summary every three years, beginning February 28, 2021.

8.1.2.2.4 *Regional Surface Flow Monitoring Plan*

The permittee must develop a Regional Surface Flow Monitoring Plan. The intent of the Regional Surface Flow Monitoring Plan is to review the permittee’s flow monitoring network in the Elk Valley (including receiving environment and discharge locations) to define the appropriate temporal and spatial frequency of flow monitoring locations. The plan should include:

- i. Definition of the assessment criteria and associated data requirements for the different types of flow monitoring locations
- ii. An assessment of each existing flow monitoring location, identification of stations not meeting the assessment criteria; and identification of locations where additional flow monitoring is needed; and,
- iii. A plan with timelines to implement or modify flow monitoring locations based on results of the assessment, including definition of

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

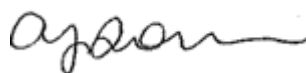
the appropriate measurement methods and acceptable data quality standard for each type of flow monitoring location.

- iv. The permittee must submit an updated version of the Regional Surface Flow Monitoring Plan for approval by the director every three years, beginning December 31, 2020. Updates must include, when appropriate, changes to the location, frequency and grading of monitoring stations and to data needs and grading criteria. In the interim if changes to the monitoring program are recommended that result in a reduction in monitoring requirements these changes must be approved by the director prior to adoption.

8.1.2.3 TEMPORARY MODIFIED SAMPLING SCHEDULE FOR THE LCO MSX SHORT DUMP PROJECT

- i. Site E304613 shall be temporarily used to collect water samples only when access to E216144 is restricted due to safety concerns with the progression of the MSX Short Dump.
- ii. At least twice per year during the duration of the MSX Short Dump Project, paired samples shall be taken from the site E304613 and E216144 when safe access is available to E216144. The results should be compared in the Annual Report.
- iii. During the duration of the MSX Short Dump Project, water samples do not have to be collected when access to 0200335 is restricted due to safety concerns with the progression of the MSX Short Dump. In the event regular scheduled sampling times cannot be met every effort must be made to obtain the number of samples normally required for a 6-month period. Missed samples and non-routine sampling times shall be itemized in the Quarterly Report.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

8.1.2.4 TEMPORARY SAMPLING SCHEDULE FOR THE FLOODPLAIN WIDENING SEDIMENT POND

The permittee must conduct the additional monitoring and sampling for the Floodplain Widening Sediment Pond as described in Table 8A below:

**TABLE 8A – FORDING RIVER OPERATIONS FLOODPLAIN WIDENING
SEDIMENT POND TEMPORARY SAMPLING SCHEDULE**

	FLOODPLAIN WIDENING SEDIMENT POND INLET	FLOODPLAIN WIDENING SEDIMENT POND IN- POND SAMPLE LOCATION
<i>EMS Number</i>	-	<i>E325312</i>
PARAMETER		
Field Parameters ^(a)	M	As per Table 13
Conventional Parameters ^(b)	M	As per Table 13
Major Ions ^(c)	M	As per Table 13
Nutrients ^(d)	M	As per Table 13
Total and Dissolved Metals Scan ^(e)	M	As per Table 13
Visual Observation	M	W(2)
Dissolved and Total Organic Carbon	-	M(1)
Selenium Speciation ⁽ⁱ⁾	-	M(1)
Chlorophyll- <i>a</i>	-	M(1)

- 1) Sample collection must be conducted immediately during the growing season (March 15 to October 31) if: standing water is present in the pond for > 1 week; and the most recent sample results received for either the pond inlet or in-pond samples show elevated levels of dissolved selenium ($\geq 2.0 \mu\text{g/L}$) and total phosphorus ($\geq 0.010 \text{ mg/L}$).
- 2) Weekly observations from March 15 to October 31 of each year.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

8.2 **GROUNDWATER MONITORING PROGRAM**

8.2.1 REGIONAL GROUNDWATER MONITORING

The permittee must implement a comprehensive regional groundwater monitoring program for Management Units 1, 2, 3, 4 and relevant portions of 5, as defined in the Elk Valley Water Quality Plan, prepared by a Qualified Professional. The intent of the program is to monitor groundwater and groundwater systems within the valley bottom unconsolidated deposits along the mainstems in the Elk Valley and where appropriate, underlying bedrock, outside the mine operations boundaries.

The program must include the following as they pertain to the regional program:

- i. A program to establish and maintain a groundwater monitoring well network in the Elk Valley, with wells (single/multi-level in unconsolidated deposits and bedrock, as appropriate for intended purpose) installed in locations that are representative of background and mine-impacted conditions.
- ii. An ongoing monitoring program, developed in accordance with the BC Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (ENV, 2016).
- iii. A conceptual hydrogeological model for the Elk Valley, developed and updated by integrating all available groundwater information collected as part of the regional and site-specific groundwater monitoring programs, relevant operational field investigations, and relevant conceptual and numerical modelling studies carried out for diverse purposes (e.g., as part of permitting applications, water supply assessments and geotechnical investigations). The conceptual hydrogeological model must include, but is not limited to, a description of the following, where relevant: aquifer characteristics (e.g., location, extent and geometry and hydraulic properties), regional groundwater flow patterns (directions, gradients and velocities), recharge and discharge areas, groundwater interactions with surface water, the effects of surface and groundwater withdrawals, groundwater quality and the transport of mine-related parameters of concern. Seasonal fluctuations and trends of all

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

relevant hydrogeological variables must also be included in the hydrogeological characterization.

- iv. An evaluation of the regional effects of the permittee's operations on groundwater and where relevant on surface water, as a result of surface water – groundwater interaction, in Management Units 1, 2, 3, 4 and relevant portions of 5, by comparison to all applicable standards.
- v. Identification of limitations and data gaps and recommendation of additional field activities and/or studies to fill in gaps, where possible, and to refine the conceptual hydrogeological model.
- vi. A proposed schedule for the additional recommended field activities and studies described in point v.
- vii. Where appropriate, identify activities, studies and investigations proposed to be discontinued or existing monitoring infrastructure to be decommissioned/removed in order to optimize/improve the program.


The plan must be updated every three years starting in 2017 and submitted to the director by September 30 for approval. Each update must consider relevant changes to permit requirements and results of special studies.

8.2.2 SITE SPECIFIC GROUNDWATER MONITORING

The permittee must develop and implement a comprehensive groundwater monitoring program at each mine site (Fording River Operations, Greenhills Operations, Line Creek Operations, Elkview Operations, Coal Mountain Operations), prepared by a Qualified Professional. The intent of each program is to monitor groundwater and groundwater systems within the valley bottom unconsolidated deposits and, where appropriate, the bedrock downgradient of potential mine-related sources of groundwater contamination within or in proximity of the mine operations boundaries.

Updated Site-Specific Groundwater Monitoring Plans must be submitted to the director for approval by October 31, 2021. Thereafter, the plans must be updated and submitted to the director for approval by October 31 every three years. The plans must include points i. to vii. in Section 8.2.1, as they pertain to each mine site.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

8.2.2.1 LINE CREEK MINE PHASE II GROUNDWATER MONITORING PROGRAM

The Permittee must develop and implement a comprehensive groundwater monitoring program for the Line Creek Mine Phase II area, prepared by a qualified professional. This program must be conducted to the satisfaction of the Director and should achieve the following objectives at a minimum:

- i. Characterize the groundwater resource (including water quality, quantity, flow characteristics, hydraulic conductivity of the affected aquifer(s), and relationship to surface water system);
- ii. Identify (and if necessary, quantify) impacts to groundwater from mining-related activities;
- iii. Provide the information necessary to support the development and verification of water quality predictions for the mine site (as per Section 10.9);

The Terms of Reference for the monitoring program shall be submitted to the Director, Environmental Protection by January 31, 2013.


The monitoring program must be submitted to the Director for approval by March 31, 2014. Monitoring activities must commence in 2014.

Monitoring results and interpretation shall be compiled into a written report and submitted on an annual basis for each calendar year to the Director, Environmental Protection, by March 31 of the following year. Included in the submission must be a Study Design for the next year.

8.2.3 SPARWOOD AREA GROUNDWATER SUPPORTING STUDY

The permittee must implement the approved Sparwood Area groundwater monitoring study. A study report must be submitted to the director as per Section 9.4.2. In the study report, the permittee must include Sparwood Ridge monitoring data relevant to the interpretation of the Sparwood Area groundwater study.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

8.2.4 CEDAR NORTH IN-PIT BACKFILL EXTENSION

8.2.4.1 The permittee must develop a study design to refine the hydrogeological characterization of fault F42 and to obtain site-specific estimates of hydraulic conductivity in the weathered bedrock located between Cedar North Pit and the Elk River and Michel Creek valley bottom. The study design must be developed by a Qualified Professional and should include, but not be limited to:

- i. estimating hydraulic conductivity using hydraulic testing methods, along the F42 fault alignment south of the interception with the conveyor tunnel, and along a hypothetical fault extension towards Michel Creek;
- ii. estimating hydraulic conductivity of the weathered bedrock to obtain site-specific estimates of hydraulic conductivity between Cedar North Pit and the Elk River valley bottom; and
- iii. establishing monitoring well(s) along the F42 fault alignment south of the interception with the conveyor tunnel at the hydraulic testing site(s), if the results indicate a potential for the fault to convey mine-impacted groundwater, currently or as a result of future mining activities.

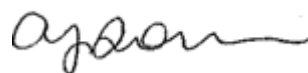
A study design for the completion of the field activities described at i. and ii. must be submitted to the director for approval by October 31, 2021. The permittee must implement the approved study design.

8.2.4.2 The permittee must update the BRE Project groundwater flow model by adding the following as calibration targets:

- i. the groundwater levels collected as part of the activities outlined in Section 8.2.4.1; and
- ii. the streamflow and groundwater level data set collected from the hydrometric stations and monitoring wells located near the model's west – southwest boundary, on Lindsay Creek, Goddard Creek, Otto Creek, Aqueduct Creek, Bodie Creek and Gate Creek.

The BRE Project groundwater flow model update must also include the simulation of faults in the model.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

8.2.4.3 The permittee must use the information obtained from activities outlined in Section 8.2.4.1 and 8.2.4.2 to refine the groundwater flow component of the water balances for the Cedar North Pit and EVO Dry Creek catchments.

8.3 **LOCAL AQUATIC EFFECTS MONITORING PROGRAM (LAEMP)**

The permittee may be required to develop, with input from the EMC, and implement a Local Aquatic Effects Monitoring program (LAEMP) to determine the effects of a mining effluent discharge(s) on the receiving environment.

8.3.1 LINE CREEK OPERATIONS

8.3.1.1 LCO Phase I

The permittee must develop and implement a Local Aquatic Effects Monitoring program to determine the effects of the Line Creek discharge on the receiving environment. An annual study design for the program must be prepared in consultation with the EMC and submitted to the director for approval by May 1 each year. Any changes to the approved study design must be reported in the annual LAEMP report.

8.3.1.2 LCO Phase II

The Permittee must develop and implement a Local Aquatic Effects Monitoring Program to determine the effects of mining activities from Line Creek Phase II in the LCO Dry Creek, Grace Creek and Unnamed Creek receiving environments. An annual study design for the program must be prepared in consultation with the EMC and submitted to the director for approval by May 1 each year. Any changes to the approved study design must be reported in the annual LAEMP report.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

8.3.2 FORDING RIVER OPERATIONS

The permittee must complete to the satisfaction of the director a study design for a LAEMP which will focus on the upper Fording River for 2021-2023 by April 1, 2021. The study design must be reviewed by the EMC and be designed to an appropriate temporal scale to capture short term, local effects to the immediate receiving environment. Any changes to the approved study design must be reported in the annual LAEMP report.

8.3.3 COAL MOUNTAIN OPERATIONS

The permittee must complete to the satisfaction of the director, a study design for a LAEMP by February 28, 2019. The study design must be reviewed by the EMC and be designed to assess the magnitude and extent of influence from CMO on water quality, calcite and benthic invertebrate communities downstream of CMO and to assess what factors are contributing to the observed effects. Any changes to the approved study design must be reported in the annual LAEMP report.

8.3.4 GREENHILLS OPERATIONS

The permittee must complete to the satisfaction of the director a study design for a LAEMP which will focus on the upper Elk River and the Elk River side channel and tributaries located on the west side of Greenhills Operation between EMS sites 0200389 and E3000090 for 2017-2020 by June 1, 2017. The study design must be reviewed by the EMC and be designed to an appropriate temporal scale to capture short term, local effects to the immediate receiving environment. Any changes to the approved study design must be reported in the annual LAEMP report.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

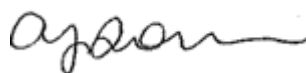
8.3.5 ELKVIEW OPERATIONS

The permittee must develop and implement a LAEMP to determine the magnitude and extent of influence from EVO SRF discharge on water quality (including temperature), calcite and benthic invertebrate communities to assess what factors are contributing to the observed effects. The study design must be reviewed by the EMC and submitted to the director for approval by June 30, 2021. The LAEMP must be designed to an appropriate temporal scale to capture short term, local effects to the immediate receiving environment, and must consider the possibility of impacts resulting from potential selenium speciation. The LAEMP must focus on Erickson Creek from EV_ECOUT (E321814) to EV_EC1 (0200097) and Michel Creek between EV_MC3 (0200203) and EV_MC2 (E300091) for 2021-2023.

Until the 2021-2023 LAEMP study design is approved and implemented, the permittee must continue the pre-operational aquatic effects monitoring program as outlined in Section 8.2.2 the EVO SRF Phase 2 Operations application.

The permittee must notify the director at least 15 days prior to implementing any proposed changes to the approved LAEMP. Any changes to the approved study design must be reported in the annual LAEMP report.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

8.4 **REGIONAL AQUATIC EFFECTS MONITORING PROGRAM (RAEMP)**

The permittee must implement the Regional Aquatic Effect Monitoring Program as per the November 14, 2014 approval or the latest director approved program. A final Study Design for each subsequent three-year cycle must be submitted to the director by February 28 in the first year of each three-year cycle.

8.5 **CALCITE MONITORING**

8.5.1 CALCITE MONITORING PROGRAM

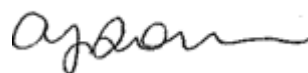
- i. The permittee shall continue to conduct annual calcite monitoring following the methods in the approved monitoring program.
- ii. The permittee shall submit, for director's approval, changes to the monitoring program by April 15 of the data collection year.

8.5.2 SEASONAL CALCITE SUPPORTING STUDY – 2015/2016

The permittee must have a Qualified Professional develop a monitoring program to assess seasonality of calcite formation and potential dissolution. The program must, at minimum, include multiple locations and assess seasonal variation in the rate of calcite formation or dissolution, water quality, and presence and density of algae, and the presence and density of benthic invertebrates.

- i. An Initial Study Design for the program must be submitted to the Environmental Monitoring Committee for input prior to submission to the director for acceptance by March 1, 2015.
- ii. Monitoring results and interpretation for the 2015 program must be compiled into a written report with a study design for the 2016 program and submitted to the satisfaction of the director by March 31, 2016.
- iii. Monitoring results and interpretation of the 2016 program must be compiled into a written report and submitted to the satisfaction of the director by March 31, 2017.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

8.6 SELENIUM SPECIATION MONITORING PROGRAM

The permittee must develop and implement a Selenium Speciation Monitoring Program. The Selenium Speciation Monitoring Program is intended to:

- Identify sites in the Designated Area, affected or potentially influenced by the permittee's current operations, where organic and reduced forms of selenium are occurring or are likely to occur;
- Investigate the physical and/or biogeochemical mechanisms driving selenium speciation and the generation of organic and reduced forms of selenium species; and
- Assess the site-specific bioaccumulation of selenium in biological resources.

The Selenium Speciation Monitoring Program must include the following elements:

- i. Assessment of water quality and selenium tissue concentrations in benthic invertebrates; and
- ii. Characterization of factors that lead to enhanced selenium bioaccumulation in the receiving environment, as applicable.

The following timelines apply:

- 1) A written report of selenium speciation data collected to-date within the Designated Area, that includes analysis and interpretation of the data, must be compiled and submitted to the EMC and the director by March 31, 2021.
- 2) Selenium Speciation Monitoring Program Study Design must be reviewed by the EMC prior to submission to the director, for approval, by July 30, 2021. Thereafter, the study design must be updated and submitted, for approval, to the director by July 30th every three years.

The approved Selenium Speciation Monitoring Program Study Design must be implemented, and an annual report must be submitted to the director and to the EMC as per Section 9.11.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

8.7 **KOOCANUSA RESERVOIR WORKING GROUP**

A Koocanusa Reservoir Monitoring and Research Working Group will be established under the BC & Montana government to government Memorandum of Understanding. The permittee must participate fully in the Koocanusa Reservoir Monitoring and Research Working Group.

The permittee is required to contribute to the costs of the Koocanusa Reservoir Monitoring and Research Program as operated by the Koocanusa Reservoir Monitoring and Research Working Group

8.8 **KOOCANUSA RESERVOIR BURBOT BASELINE STUDY 2015**

The permittee shall undertake a sampling program in Koocanusa Reservoir to evaluate the potential for selenium related effects in Burbot. The permittee shall make reasonable efforts to collaborate with Ktunaxa Nation representatives to identify suitable fishing locations in Koocanusa Reservoir, to develop a sampling plan, and to implement the program.

The sampling must be initiated in February 2015 and include the following:

- i. Sampling will occur at representative locations within Koocanusa Reservoir and should consider areas upstream of Elk River, near the mouth of the Elk River, and near of the mouth of Gold Creek.
- ii. All fish captured during the sampling program will be identified and enumerated with results captured on field sheets and sexually mature burbot measured and sampled in the field as follows:
 - a) Field examination of condition of each fish for external deformities, erosions, lesions, or tumors with condition recorded on field sheets
 - b) Muscle tissue will be sampled from each fish
 - c) Collection of eggs from up to 10 ripe female burbot from the three sampling locations where available.
- iii. Tissue and eggs will be analysed for metals using a high-resolution inductively coupled plasma mass spectrometry.
- iv. Results will be reported on a dry weight basis along with the moisture content.

Results of the sampling program shall be submitted to the director by July 31, 2015.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

The permittee will evaluate the human health risk with respect to Ktunaxa consumers specific to the burbot tissue data.

8.9 **CHRONIC TOXICITY TESTING PROGRAM**

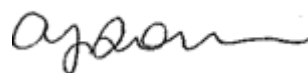
The permittee must develop and implement a toxicity testing program for receiving environments affected by coal mining operations. The purpose of the program is to evaluate chronic toxicity at the compliance points and other locations throughout the Elk Valley.

The program shall be planned and implemented by qualified professionals using methods that have documented test procedures, reliability, and quality assurance.

The toxicity testing program must include, at a minimum, the following elements:

- i. Once every three years beginning in 2015, bioassays must be conducted to evaluate the survival and development (incidence of deformities) of targeted aquatic species using gametes obtained from species using habitats in the Elk River, the Fording River, their tributaries, and associated lentic habitats, and the Koocanusa Reservoir. The concentrations of selenium in the eggs of each female spawned must be measured.
- ii. For the purposes of the following requirements the listed mine-influenced stations must include:
 - FR_FRCP1 (EMS E300071),
 - FR_FRABCH (EMS 223753),
 - GH_FR1 (EMS 0200378),
 - LC_LC5 (EMS E200028),
 - GH_ERC (E300090),
 - CM_MC2 (EMS E258937),
 - EV_MC2 (EMS E300091),
 - EV_HC1 (EMSE102682),
 - LC_LCDSSLCC (EMS E297110),
 - LC_LC3 (EMS 200337), and

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- LC_DCDS (EMS E295210).

Appropriate reference stations must be determined in consultation with the Environmental Monitoring Committee.

The following toxicity test must be conducted during each semi-annual (spring and fall) sampling event at all listed mine-influenced stations plus multiple reference stations:

- 30-day early life-stage test with the rainbow trout (*Oncorhynchus mykiss*; EPS1/RM/28) using <24-hour post-fertilization eggs; endpoints: survival, viability, length, wet weight (plus documentation of observed deformities or behavioral changes); and
- 28-day water-only test with amphipod, *Hyaella azteca* (adapted from USEPA 2000, with appropriate supplementation of halides); endpoints: survival, growth.

The following toxicity tests must be conducted during each semi-annual (summer and winter) sampling event at all listed mine-influenced stations plus multiple reference stations:

- 30-day early life-stage test with the fathead minnow, *Pimephales promelas* (USEPA 1996) using <24-hour post-fertilization eggs; endpoints: survival, normal development, length, biomass (plus documentation of observed deformities or behavioral changes).

The following toxicity tests must be conducted during each quarterly sampling event at all listed mine-influenced stations plus multiple reference stations:

- 7-day water-only test with the cladoceran, *Ceriodaphnia dubia* (EPS1/RM/21); endpoints: survival, reproduction; and
- 72-hour test with the alga, *Pseudokirchneriella subcapitata* (EPS1/RM/25); endpoints: growth inhibition.

- iii. Toxicity testing methods must be consistent with Environment Canada's, U.S. Environmental Protection Agency's, or ASTM's approved biological test methods. Waters used for fathead minnow (*Pimephales promelas*) and rainbow trout (*Oncorhynchus mykiss*) 30-day early life-stage tests may be augmented with up to, and not exceeding, 20 ug/L copper to control for fungi and microbial pathogens. Ameliorating factors that influence copper toxicity (e.g., water hardness, dissolved organic carbon, and major ions) must be considered when determining the lowest and most effective dose below this limit.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- iv. A Quality Assurance/Quality Control component.
- v. A proposed schedule of dates that coincide with water quality sampling and that target predicted worst-case times such as low flow, during flocculant use, or when discharge quality is expected to be reduced.

The suite of toxicity tests will be reviewed on an annual basis by the EMC and recommendations provided to the director for consideration.

8.9.1 SULPHATE TOXICITY AT HIGH HARDNESS CONCENTRATIONS

The permittee must develop with input from the EMC and implement a toxicity testing program specifically to assess sulphate toxicity at high hardness concentrations. Results will be used to support finalization of long-term sulphate site performance objectives.

The following toxicity test shall be conducted as a component of the Sulphate toxicity testing program.

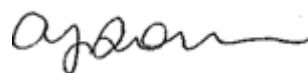
- 30-day early life-stage test with the fathead minnow, *Pimephales promelas* (USEPA 1996) using <24-hour post-fertilization eggs; endpoints: survival, hatching, growth, deformity.
- Other sensitive species (amphibian, trout, water flea, etc.) shall be included.

Monitoring results and interpretation must be compiled into a written report and submitted to the satisfaction of the director by December 31, 2017.

8.9.2 SUBLETHAL TOXICITY STUDY

The permittee must develop with input from the EMC and implement a sublethal toxicity study to confirm that surface waters meeting the Site Performance Objectives for the order stations are not toxic to sensitive aquatic receptors. The permittee must submit the study design to the director by April 30, 2015.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

8.10 HUMAN HEALTH RISK ASSESSMENT

The permittee must conduct a Human Health Risk Assessment (HHRA), in consultation with the EMC to examine the potential effects of mine-related parameters of concern including selenium, mercury cadmium, chromium, copper, manganese, nickel, vanadium and zinc for the Designated Area. The permittee is responsible for developing the HHRA design and addressing any concerns raised by the Interior Health Authority.

A draft terms of reference and a work plan for the HHRA must be discussed at the EMC. A final terms of reference and work plan for the HHRA shall be submitted by May 31, 2015 and be of a quality acceptable to the director.

The Human Health Risk Assessment must follow the BC Contaminated Sites Regulation approved methodologies and levels of acceptable risk for Human Health Risk Assessment.

The permittee must provide the results of the HHRA by March 31, 2016 to the EMC. The permittee must provide the results of the HHRA to the director by March 31, 2016. The risk assessment must be to the satisfaction of the director.

The assessment must determine the exposure pathways and potential human health risks from selenium and other mine-related parameters of concern which may be present in vegetation, fish and wildlife that are potentially used for food or medicinal sources, or present in currently known potable water sources. The assessment must take into consideration First Nations consumption patterns and risk sensitivities.

The study must incorporate information available from a variety of sources such as: traditional use studies, consultation records, consumption surveys, and baseline and monitoring data for mine-related parameters of concern.

Wherever possible, the assessment must incorporate data obtained from established monitoring programs. If required for the assessment, additional sampling programs must be implemented to ensure data gaps are addressed.

The conclusions and findings of the Human Health Risk Assessment shall be risk ranked and prioritized and include recommended risk management controls and other mitigation actions to address human health risks identified

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

in the human health risk assessment for inclusion in the adaptive management plan for the area.

8.11 **SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT**

The permittee shall re-evaluate the Screening Level Ecological Risk Assessment. The Screening Level Ecological Risk Assessment re-evaluation must address the following points:

- i. some contaminants of potential concern exceeded the criteria for negligible risk,
- ii. there was an incorrect use of tissue concentrations as indicators of toxicity, and
- iii. multiple food type dietary exposure was not incorporated.

The re-evaluation must be conducted by an approved Contaminated Sites Approved Professional (CSAP) or follow the BC Contaminated Sites Regulation approved methodologies. If the re-evaluation is not conducted by an approved CSAP, the re-evaluation must be submitted to the director for review and acceptance. The re-evaluation shall be submitted by July 31, 2015.

In the event that this re-evaluation determines changes to the monitoring requirements, this information shall be shared with the EMC and a report with recommendations provided to the director regarding the outcome of the re-evaluation.

8.12 **DETAILED ECOLOGICAL RISK ASSESSMENT**

A Detailed Ecological Risk Assessment may be required.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

9. **REPORTING REQUIREMENTS**

9.1 **SUBMISSION RESULTS**

The permittee must submit the results of the discharge and receiving environment water sampling program directly into the EMS database using the appropriate EMS site identification numbers within 30 days of the end of the quarter in which the samples were collected. Flow data is to be submitted annually.

For instructions on the electronic submission process or for more information visit the Ministry website:

<https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/ems-data-uploads>

All data and calculations required in this permit but not uploaded to EMS must be managed by the permittee and provided to the director or member of the EMC upon request in a format specified by the director or member of the EMC. The permittee must provide all requested data within 10 business days of the original request or within the timeline agreed upon by both the permittee and the requestor.

All data lab sheets are to be kept on site and are to be provided in an electronic format to the director or member of the EMC upon request.

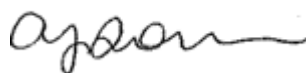
All deliverables required by Section 9 must not exceed manageable file sizes or must be divided into smaller files prior to submittal.

9.2 **DISCHARGE AND RECEIVING ENVIRONMENT MONITORING DATA**

9.2.1 NON-COMPLIANCE NOTIFICATION

The permittee must immediately notify the director or designate by e-mail (ENVSECoal@gov.bc.ca) of any non-compliance with the requirements of this permit, including requirements within the appendices, by the permittee and take appropriate remedial action to remedy any effects of such non-compliance.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

The permittee must provide the director and KNC with written confirmation of all such non-compliance events, including available test results within 24 hours of the original notification unless otherwise directed by the director.

9.2.2 NON-COMPLIANCE REPORTING

If the permittee fails to comply with any of the requirements of this authorization, the permittee must, within 30 days of such non-compliance, submit to the director and KNC, a written report that is satisfactory to the director and includes, but is not necessarily limited to, the following:

- i. all relevant test results obtained by the permittee related to the noncompliance,
- ii. an explanation of the most probable cause(s) of the noncompliance, and
- iii. a description of remedial action planned and/or taken by the permittee to prevent similar noncompliance(s) in the future.

The permittee must submit all non-compliance reporting required to be submitted under this section by email to (ENVSECoal@gov.bc.ca).

9.2.3 MONITORING AND REPORTING FOLLOWING TOXICITY NON-COMPLIANCE

In addition to Section 9.2.1, for any acute toxicity test failure in the effluent, the permittee must:

- i. Immediately conduct a confirmatory test on the effluent using multiple concentrations (i.e. 96 hr LC50 for Rainbow Trout or 48 hr LC50 for *Daphnia magna*, as appropriate). The director may require a Toxicity Identification Evaluation (TIE) to be initiated to determine the cause of the effluent toxicity,
- ii. Immediately take corrective action, and
- iii. Forward all test results including raw laboratory data sheets to the director as soon as they are available. As soon as possible, submit a full report indicating the cause and effects of the incident, which identifies all actions taken by the permittee to correct, restore and prevent a similar event from occurring in the future. This report

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

must be submitted with the next quarterly report or as otherwise instructed by the director.

9.2.4 QUARTERLY REPORTING

The permittee must submit a written quarterly report to the director or designate, due within 30 days of the end of the quarter in which the samples were taken. The quarterly report must include:

- i. Effluent water quality results used to calculate monthly averages for the limits in Section 2, if applicable;
- ii. Effluent water quality results exceeding limits and targets or other criteria, such as daily maximums or as specified by the director;
- iii. Identification of all missing data and all QA/QC issues;
- iv. All toxicity test results and raw laboratory data sheets for all mortality results;
- v. All reportable spills or other incidents related to water quality, occurring in the quarter;
- vi. Explanation of the most probable cause(s) of any non-compliances;
- vii. All measures taken to reduce or eliminate non-compliances;
- viii. All other reports or documentation as specified by this permit to be submitted quarterly; and
- ix. Any additional sampling results for the compliance points identified in Section 2 obtained for any reason, whether compliance, maintenance, or operational purposes. All test data must be reported within 30 days of the end of the quarter in which sampling occurred. These additional results may be reported in summary form. Further information on the testing event may be requested in writing by the director.
 - a) Any data collected at the compliance points in Section 2 for research-oriented activities that do not meet the analytical requirements in Section 8.1.2.1 of the Permit must be submitted separate from Quarterly Reports in a project report at the completion of the applicable study.
- x. A summary of measures taken under the Nitrogen Source Control Plan, Section 5.3.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

The format of the quarterly report shall be suitable for review by the public.

9.2.5 ANNUAL REPORTING

The permittee must prepare on an annual basis a report or series of reports summarizing activities, incidents, and discharge/receiving environment monitoring results. The report(s) must include but is not limited to:

- i. A map of monitoring locations with EMS and permittee descriptors.
- ii. A summary of non-compliances with the permit conditions for the previous calendar year. This must include interpretation of significance, and the status of corrective actions and/or ongoing investigations.
- iii. A summary of measured parameters including all collected monitoring data for the reporting year suitably tabulated (i.e., excel spreadsheets), appropriate graphs and comparison of results to limits, Approved and Working Water Quality Guidelines, Site Performance Objectives, or other criteria and benchmarks as specified by the director.
- iv. An analysis and discussion of early warning triggers for management action as developed under the Adaptive Management Plan for surface water quality. This analysis will include order constituents and non-order parameters of concern at key receiving environment sites as identified in the AMP and an evaluation of upstream source sites and activities when monitoring results exceed the early warning trigger criteria.
- v. All acute toxicity test-specific reports from the laboratory and an interpreted summary and discussion of results, including recommendations and all subsequent actions.
- vi. All acute toxicity test lab reports must include data and/or observations for hardness, alkalinity, pH, temperature, and formation of precipitate either in the vessel or on the organism.
- vii. A summary of all QA/QC issues during the year.
- viii. The following hydrology information:

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- a) A description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary.
 - b) A summary table of the discharge measurements recorded during the year. The summary must include staff gauge measurements, calculated flow values from a stage-discharge rating curve, and manual flow measurements.
 - c) A hydrograph(s) at a scale appropriate for visually comparing flow values between stations.
 - d) A data quality grade for each monitoring station using the Manual of British Columbia Hydrometric Standards (RISC, 2018) methodology, and comparison of the grade to target grades as listed in the Regional Surface Flow Monitoring Program.
 - e) In conjunction with the submission of the annual report, final non-continuous flow data will be uploaded to the EMS database while final continuous flow data records and associated rating curves will be provided in Excel format.
- ix. An interpreted summary and discussion of the effectiveness of measures taken under the Nitrogen Source Control Plan, Section 5.3.

The Annual Report must be submitted to the director by March 31 of each year following the data collection calendar year.

The format of the Annual Report shall be suitable for review by the public. The Permittee must post a copy of the report to the Teck website annually, within six months of submission. Copies must be made available for the Ministry of Energy, Mines, and Petroleum Resources and Ktunaxa First Nation. The Permittee may omit proprietary information from the publicly available annual report in accordance with the Freedom of Information and Protection of Privacy Act, as agreed to by the Director.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

9.3 TOXICITY REPORTING

All acute toxicity test lab reports must include data and/or observations for pH, temperature, and formation of precipitate either in the vessel or on the organism. Lab reports for the 48-hour *Daphnia magna* single concentration toxicity test must also include data and/or observations for hardness and alkalinity.

The permittee must prepare on an annual basis a report summarizing all acute and chronic toxicity data from the laboratory and an interpreted summary and discussion of results, including recommendations and subsequent actions. The report is to be submitted to the director by April 30 of each year following the data collection calendar year.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

9.4 **GROUNDWATER**

9.4.1 ANNUAL GROUNDWATER MONITORING REPORTING

The permittee must prepare on an annual basis a report or series of reports summarizing monitoring activities and results for the Regional and Site-Specific Groundwater Monitoring Programs. The annual report(s) must be submitted to the director by March 31st of each year following the data collection calendar year.

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

- i. A map of surface and groundwater monitoring locations with EMS and permittee descriptors;
- ii. Cross sections showing well installation details, stratigraphy, groundwater elevations, and where relevant surface water elevations and inferred groundwater flow direction(s). Cross sections should be in the direction of groundwater flow and/or perpendicular to groundwater flow, as appropriate;
- iii. Drawings showing locations and water quality data of groundwater sampling points;
- iv. Summary of program modifications relative to previous years and additional one-time activities, such as the installation of new monitoring wells;
- v. 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. Evaluation and discussion of the correlation between the monitoring results of surface water and groundwater monitoring stations, where relevant, in terms of spatial distribution and temporal changes;
- ix. Relevant information from specific studies on surface water and groundwater to support the hydrogeological characterization;
- x. A summary of all QA/QC issues during the year; and
- xi. Recommendations for further study or measures to be taken.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

9.4.2 SPARWOOD AREA GROUNDWATER STUDY REPORT

The permittee must prepare a report summarizing monitoring activities and results for the Sparwood Area Groundwater Study and submit it to the director by May 31, 2021.

The report must include, but is not limited to:

- i. Items i. to x. in Section 9.4.1, as they pertain to the study; and
- ii. Recommendations related to the next steps for the study.

9.5 LAEMP

The LAEMP Annual Reports must be reported on in accordance with generally accepted standards of good scientific practice in a written report and submitted to the director of each year following the data collection calendar year on the following dates:

- i. LCO LAEMP: April 30
- ii. GH0 LAEMP: May 31
- iii. FRO LAEMP: May 31
- iv. CMO LAEMP: June 30 (The first report is due June 30, 2020)
- v. EVO LAEMP: June 30 (The first report is due June 30, 2022)

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

9.6 RAEMP

The RAEMP report for the first approved cycle under the ABMP must be submitted to the director by September 30, 2017 and by November 30 of the final year of each subsequent three-year monitoring cycle.

The permittee shall submit a report that contains a detailed rationalization of the overall RAEMP including reasons why specific monitoring areas are/are not being monitored in a given year. The report may include a discussion and analysis of the results of the previous cycle of monitoring of the following components:

- i. Water quality
- ii. Sediment quality and calcite
- iii. Water and sediment toxicity testing
- iv. Periphyton productivity and community structure
- v. Benthic invertebrate community structure and tissue contaminants
- vi. Fish population metrics and tissue contaminants
- vii. Amphibian and bird egg tissue contaminants
- viii. QA/QC

Each report will also discuss cumulative effects by providing an integrated interpretation of conditions in the Elk River Watershed.

Each report will, on a three-year cycle, verify and calibrate the selenium bioaccumulation model using the most recent three years of water quality, aquatic effects and other data from any special studies undertaken.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

9.7 CALCITE

A Calcite Monitoring Annual Report must be submitted to the director by April 15 of each year following the data collection calendar year. The report must include the following, at minimum:

- i. A map of monitoring locations;
- ii. A summary of background information on that year's program, including discussion of program modifications relative to previous years;
- iii. Results of stream selection reassessment – highlight streams added/removed;
- iv. Summary of where sampling followed the methodology in the monitoring plan document, and details where sampling deviated from the approved methodology;
- v. Statement of results for the period over which sampling was conducted;
- vi. Reference to the raw data, provided as appendices;
- vii. General discussion of observations, including summary tables of sites with increasing and decreasing deposition indices;
- viii. Interpretation of location, extent, and any other observations;
- ix. A summary of any QA/QC issues during the year;
- x. Recommendations for sites to add, sites to remove, modifications to methodology, monitoring frequency adjustments; and
- xi. A statistical evaluation of monitoring data to evaluate the presence of short and long term calcite related trends in the Elk Valley main stems and select tributaries.

9.8 KOOCANUSA RESERVOIR

The permittee must prepare on an annual basis a report summarizing activities and monitoring results. The report must be submitted to the Koocanusa Reservoir Monitoring and Research Working Group (Koocanusa Reservoir Working Group) and the EMC by June 30 of each year.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

9.9 WATER QUALITY MODELLING

The permittee must update the regional water quality model and complete a water quality prediction report for each mine site and the Designated Area as a whole to be submitted to the director.

This report must be updated every 3 years starting October 31, 2017, or more frequently as required, based on changes to the mine plan, when observed water quality and water quantity are regularly and significantly different from predicted values, or as otherwise required by the director in writing. The report must include data collected from the monitoring programs described in Section 8 as well as any other special studies undertaken to investigate water quality in the Designated Area.

On a three-year cycle, verify and, failing verification, calibrate the Elk Valley Regional Water Quality Model using the most recent three years of water quality data and regional flow data from appropriate (e.g. Environment Canada regional) hydrometric data stations.

The report must provide:

- i. Current and projected (through the next twenty years) bank cubic meters of waste rock at the mine, detailed by affected drainage;
- ii. Hydrology modelling information, detailed by affected drainage:
 - a) Identify the specific hydrology information used in the modeling work;
 - b) An evaluation of the relative data accuracy/precision and overall confidence in the data used. The evaluation should consider any relative bias that a station may introduce (e.g. a stations' ability to represent total watershed yield). Documentation must clearly provide a rationale for why specific data was selected for use in the model;
- iii. Current and predicted concentrations of Parameters of Concern as required, in the surface water of affected drainages through the life of the mine based on current model, which incorporates waste rock volumes and local hydrology, compared to BC Water Quality Guidelines or water quality targets for selenium, nitrate, sulphate and cadmium;

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- iv. A description of the calibration and validation of the flow model and water quality;
- v. A sensitivity analysis for variation in flows and potential errors in measured input data;
- vi. Water quality and water quantity model output in electronic format;
- vii. A monitoring plan for continued evaluation of ii), iii) and iv) as the mine progresses;
- viii. Refined hydrology, hydrogeology and geochemical source term information (including refinements for cadmium source terms), together with any site-specific water balance models and hydrogeology studies;
- ix. Changes to the mine plan; and
- x. Information and outcomes from research and technology development studies that have been incorporated into the model.

9.9.1 EVALUATION OF WATER QUALITY MODELLING FOR TRIBUTARIES (LCO)

- i. The permittee shall assess the conservatism and uncertainty associated with the scaling approach used to predict tributary concentrations in the EVWQP by independent comparison with predictions obtained from project specific model outputs and provide recommendation for evaluating future water quality in tributaries in the Elk River watershed.
- ii. During operations, the Permittee must track waste rock placement, water quality and flow monitoring data to enable calibration, updating and refinement of the water quality predictions and model. The Permittee must complete the first water quality prediction report for Line Creek Operations and submit it to the Director, Environmental Protection by March 31, 2014.
- iii. A report presenting the comparison and analysis of water quality modelling methods, as well as a list of tributaries where the scaling method was/or was not applied in the EVWQP shall be provided to the director by February 28, 2015.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

9.10 **ENVIRONMENTAL IMPACT ASSESSMENT - CHANGES TO MINE PLANS**

Where changes to a mine plan requires amendment of the *Mines Act* Permit for a site, the permittee shall provide the director and KNC with a project description detailing the changes and results of water quality modelling that assesses the effects on water quality at the applicable order stations/compliance points. The director may require an environmental impact assessment to be completed to evaluate the effects of the changes on the environment.

9.10.1 FRO MINE PLAN

If FRO's mine plan changes such that FRO's total waste rock volume exceeds the maximum volume assessed in the Swift Environmental Assessment Certificate application and the North Spoil Re-handle screening-level assessment an environmental effects assessment be conducted.

9.11 **SELENIUM SPECIATION MONITORING PROGRAM**

The permittee must prepare an annual report documenting the activities and results of monitoring undertaken for each element of the Selenium Speciation Monitoring Program, as per Section 8.6. The report must be submitted to the director and the EMC by April 15th of each year.

10. **ADAPTIVE MANAGEMENT**

The permittee must develop and implement a detailed adaptive management plan (AMP) to support implementation of the ABMP, to achieve water quality targets including calcite targets, ensure that human health and the environment are protected, and where necessary, restored, and to achieve continuous improvement of water quality in the Elk Valley. The adaptive management cycle consists of six stages, as summarized below. Elements of the AMP required for this permit have been included in the ABMP, but other key components remain outstanding, as described below. The permittee must prepare and implement an AMP to the satisfaction of the director. The AMP must fulfill the following requirements at a minimum:

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

1) Stage one – Assess and Define the Scope

- a) Section 1.2 of the Elk Valley Area Based Management Plan identifies the following environmental management objectives that apply to the AMP: protection of aquatic ecosystem health; management of bioaccumulation of Parameters of Concern in the receiving environment (including fish tissue); protection of human health; and protection of groundwater.
- b) The AMP should support continuous improvement of water quality conditions in the Elk Valley such that human health and ecosystem health are protected in the long-term, without restrictions or limitations on the use of water resources or associated biological resources.
- c) Identify areas of uncertainty for further analysis and development of hypotheses to support adaptive management. Uncertainties may include effects on aquatic health, actual water quality conditions in space and time, treatment capability and results, R&D project success and implementation, efficacy of passive and semi-passive mitigation methods, etc.
- d) The conceptual water quality model in Annex D of the ABMP should link management activities to effects to water quality and other components of the aquatic environment.
- e) Select measurement end points for monitoring and determining what activities and/or actions could be adjusted to influence the measurement endpoints to improve water quality and the aquatic environment to meet the environmental management objectives of the ABMP.

2) Stage two – Design of Adaptive Management Plan

- a) Review of existing monitoring programs in relation to uncertainties and alternative hypotheses developed above in 1.b and ensure that the monitoring will provide sufficient information to evaluate which hypothesis is most supported. Clear linkages between the AMP and the RAEMP, supporting studies, other monitoring and water quality modelling must be included.
- b) Establish early-warning triggers for management action. If not already in place, identify the locations where the indicators will be monitored and develop a monitoring program to assess the status of these indicators.
- c) An assessment framework for evaluating whether an outcome is acceptable or not must be provided. Monitoring and operational outcomes or indicators must be detailed and what responses will be taken as a result of exceedances

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

of each indicator, as well as the order and timeframe in which the responses will be implemented.

- d) Develop and test hypotheses associated with alternative mitigation strategies. The intention is to evaluate applying active adaptive management to research and development activities related to non-active water treatment plant technologies and calcite management.
- 3) Stage three – Implement the Adaptive Management Plan
 - a) Implement the AMP as designed.
 - b) Document all deviations to the AMP including rationale and information considered in the decision to deviate.
 - 4) Stage four - Conduct Monitoring
 - a) Implement and follow the various monitoring programs and supporting studies in this permit and within the ABMP. Additional monitoring may be required as per 2.b above.
 - b) Identify how collected information/data will be managed to facilitate evaluation of hypotheses and status of indicators.
 - 5) Stage five – Evaluate the results of monitoring activities
 - a) Describe how the information/data from the monitoring programs and supporting studies will be analyzed/evaluated for the AMP.
 - b) Document exceedances of the indicators and the management responses that were undertaken.
 - c) Identify whether the results were expected, where results deviated from those expected, why the deviations occurred, and what lessons were learned.
 - d) Communicate results to the EMC (Section 11.2).
 - 6) Stage six – Adjust and Revise the Hypotheses and Management Strategies
 - a) Adjust the ABMP implementation plans and actions as required, including knowledge gained from Section 7.2 – Research and Development.
 - b) Communicate changes to ABMP implementation plans and activities to the EMC.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

- c) Reassess expected outcomes, potential impacts, and responses to these outcomes for an adjusted plan. Where plan components are related to impacts on Human Health, the permittee shall make reasonable efforts to consult with Interior Health (hbe@interiorhealth.ca).
- d) Adjust the AMP as required in consultation with the EMC.

The permittee must develop and implement an Adaptive Management Plan to ensure that the management goals in the approved ABMP are met. The permittee shall deliver the following:

- i. The permittee must prepare a draft Terms of Reference (TOR) for the Adaptive Management Plan for discussion at the EMC by February 15, 2015.
- ii. The permittee must submit a final TOR by March 15, 2015 to the director for review and approval.
- iii. The permittee must prepare a draft AMP for discussion at the EMC by September 30, 2015.
- iv. The permittee must submit the final AMP by February 29, 2016 to the director for review and acceptance.
- v. The permittee must prepare and submit an annual report documenting the activities undertaken in each stage of the Adaptive Management Plan. The AMP report must be submitted to the director annually by July 31. The first AMP report is due July 31, 2016.
- vi. The permittee must update and revise the AMP every three years. The next update report is due December 15, 2021.
- vii. The permittee shall implement the AMP to the satisfaction of the director.
- viii. The permittee shall notify the director immediately regarding significant deviations from or adjustments to the accepted AMP (e.g., changes in triggers, responses, timeframes and/or study designs).

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

11. DATA ANALYSIS ACCOUNTABILITY AND TRANSPARENCY

11.1 FIRST NATIONS REPORTING REQUIREMENT

Unless otherwise agreed to by the KNC and the permittee, the permittee shall provide the KNC with information related to any material changes to the Initial Implementation Plan, Adaptive Management Plan, the Calcite Management Plan and the Research and Technology Development Plan. In addition, the permittee shall provide the KNC with all data, information and/or reports generated during the implementation of these plans in accordance with this permit.

11.2 ENVIRONMENTAL MONITORING COMMITTEE (EMC)

The permittee must establish an Environmental Monitoring Committee (EMC), consisting of representatives from the Ministry of Environment and Climate Change Strategy, the Ministry of Energy and Mines, Environment Canada, the Ktunaxa Nation, Interior Health Authority, and the permittee. The Committee will review submissions and provide technical advice to the permittee and director regarding monitoring submissions in Sections:

- 8.2.1 Groundwater Monitoring Program
- 8.3 Local Aquatic Effects Monitoring
- 8.4 Regional Aquatic Effects Monitoring
- 8.5 Calcite Monitoring
- 8.6 Selenium Speciation Monitoring Program
- 8.9 Chronic Toxicity Testing Program
- 8.10 Human Health Risk Assessment
- 10. Adaptive Management
- 11.3 Third-Party Audit

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

The committee will also provide input to the permittee regarding reports which are required under Sections:

- 4 Tributary Evaluation and Management
- 8.8 Koocanusa Reservoir Burbot Baseline Study 2015
- 9.2.5 Annual Reporting
- 9.3 Toxicity Reporting
- 9.4 Groundwater
- 9.5 LAEMP
- 9.6 RAEMP
- 9.7 Calcite
- 9.8 Koocanusa Reservoir
- 9.9 Water Quality Modelling
- 9.11 Selenium Speciation Monitoring Program
- 10 Adaptive Management
- 11.3 Third-Party Audit

The EMC will convene a public meeting once per calendar year for the purpose of informing the public of information reviewed by the committee and any audit results as per Section 11.3.

The EMC will confirm the scope of third-party audit in Section 11.3 a minimum of 9 months prior to the audit submission deadline.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

11.3 THIRD-PARTY AUDIT

Monitoring data for this permit and its analysis is subject to the review and audit by a third-party qualified professional on a three-year cycle. The audit must include a review of monitoring data and data analysis for reports submitted under this permit relevant to at least three components (monitoring endpoints) of Teck's environmental monitoring programs undertaken as requirements of this permit for the previous three years and must address at least the following:

- i. Data quality and completeness;
- ii. Protocols and procedures from the QA/QC plan for the monitoring program; and,
- iii. Standard operating procedures and data handling protocols in place for Teck Coal Limited.

The audit objectives scope, components, and criteria must be selected in consultation with the EMC. Each Third-Party Audit Report must be submitted to the EMC and to the director, by October 31 of each audit year. The next Third-Party Audit Report must be submitted to the director by October 31, 2020. The Third-Party Audit Report must report on actions taken to address findings of previous reports.

12. SECURITY

Although financial security under the *Environmental Management Act* is not required at this time, the director may require security in the amount and form subject to the conditions the director specifies.

13. PUBLICATION OF DOCUMENTS

The Ministry publishes Regulatory Documents on its website for the purpose of research, public education, and to provide transparency in the administration of environmental laws. The permittee acknowledges that the Province may publish any Regulatory Document submitted by the permittee, excluding information that would be excepted from disclosure if the document was disclosed pursuant to a request under section 5 of the *Freedom of Information and Protection of Privacy Act*, and the permittee consents to such publication by the Province.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Permit Number: 107517

APPENDICES 1A-1J: TECK COAL LIMITED OPERATIONS MAPS

APPENDIX 1A – Teck Coal Limited Location Map

APPENDIX 1B – Teck Coal Limited Sampling Locations Overview Map

**APPENDIX 1C – Teck Coal Limited Sampling Locations Map – Compliance
Points**

APPENDIX 1D – Teck Coal Limited Sampling Locations Map – Order Stations

**APPENDIX 1E – Teck Coal Limited Sampling Locations Map – Koocanusa
Reservoir**

**APPENDIX 1F – Teck Coal Limited Sampling Locations Map – Fording River
Operations**

**APPENDIX 1G – Teck Coal Limited Sampling Locations Map – Greenhills
Operations**

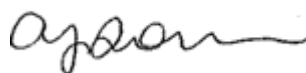
**APPENDIX 1H – Teck Coal Limited Sampling Locations Map – Line Creek
Operations**

**APPENDIX 1I – Teck Coal Limited Sampling Locations Map – Line Creek
Operations Phase II**

**APPENDIX 1J – Teck Coal Limited Sampling Locations Map – Elkview
Operations**

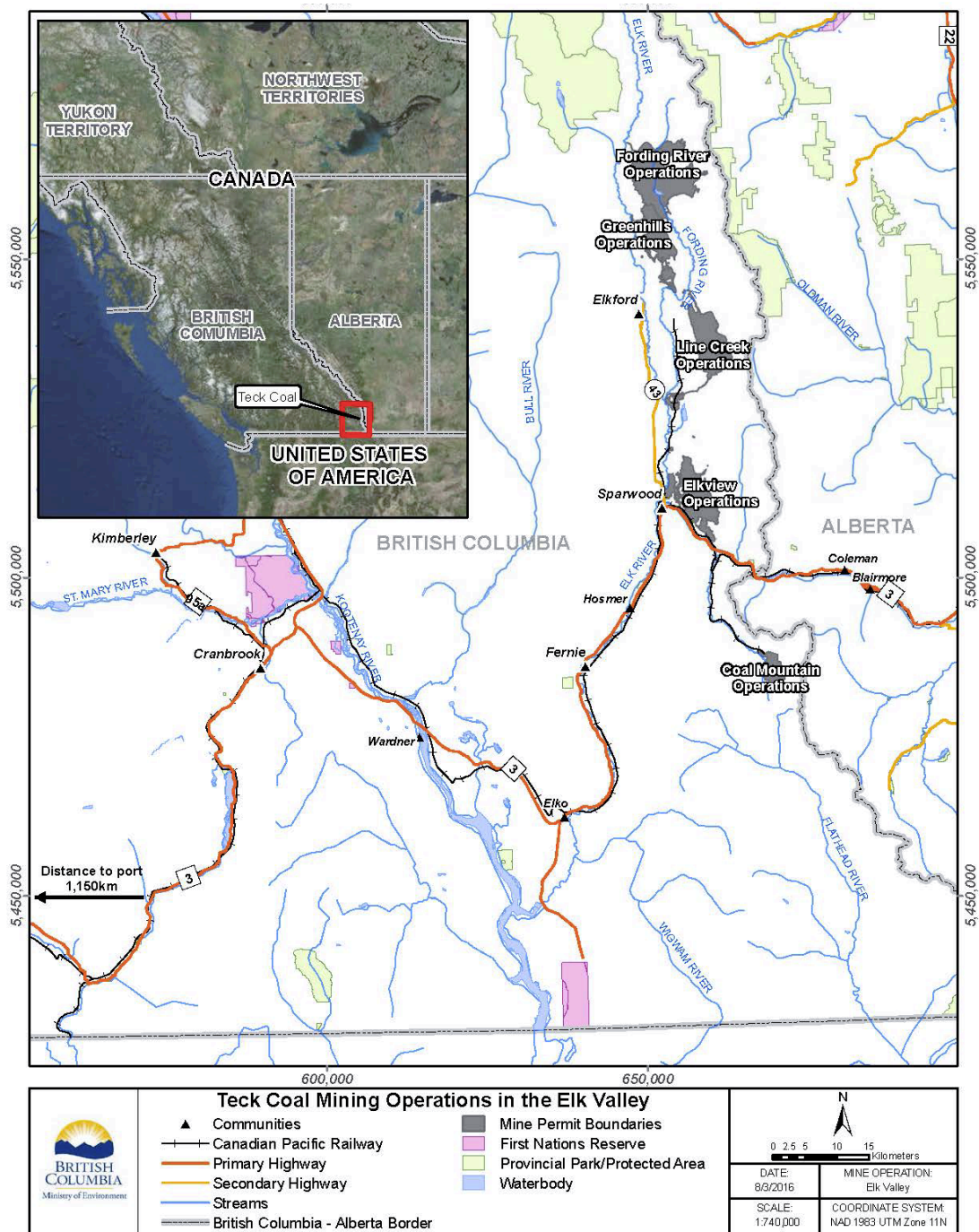
**APPENDIX 1K – Teck Coal Limited Sampling Locations Map – Coal Mountain
Operations**

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDIX 1A – Teck Coal Limited Location Map

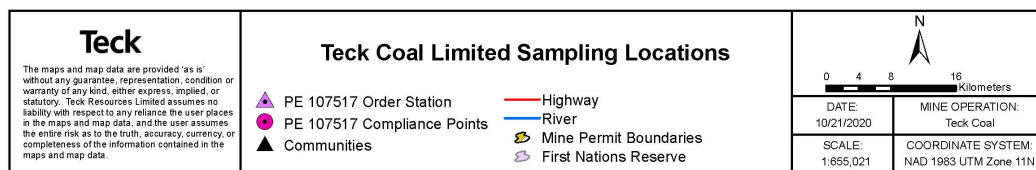
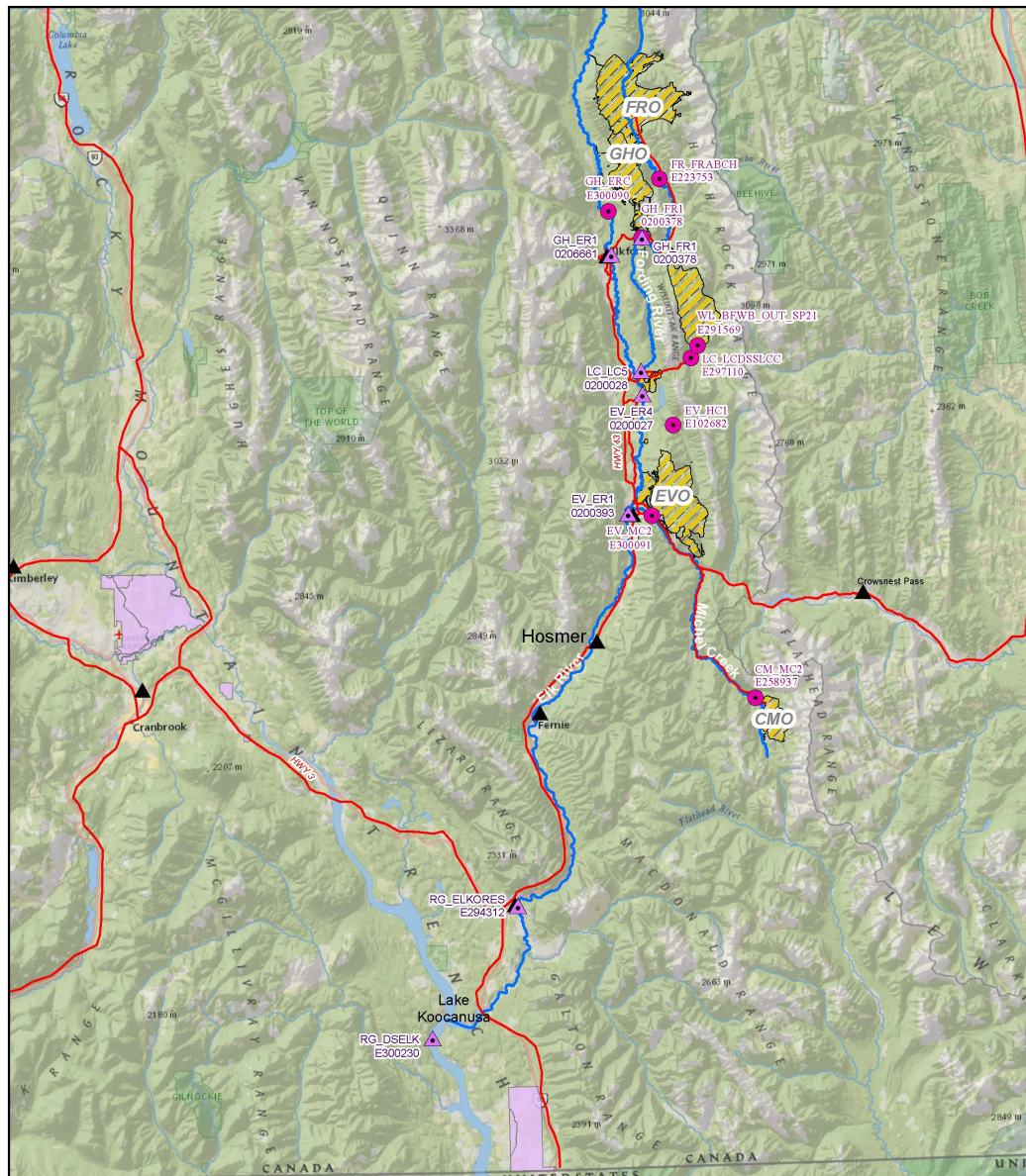


Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)

A.J. Downie

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDIX 1B – Teck Coal Limited Sampling Locations Overview Map



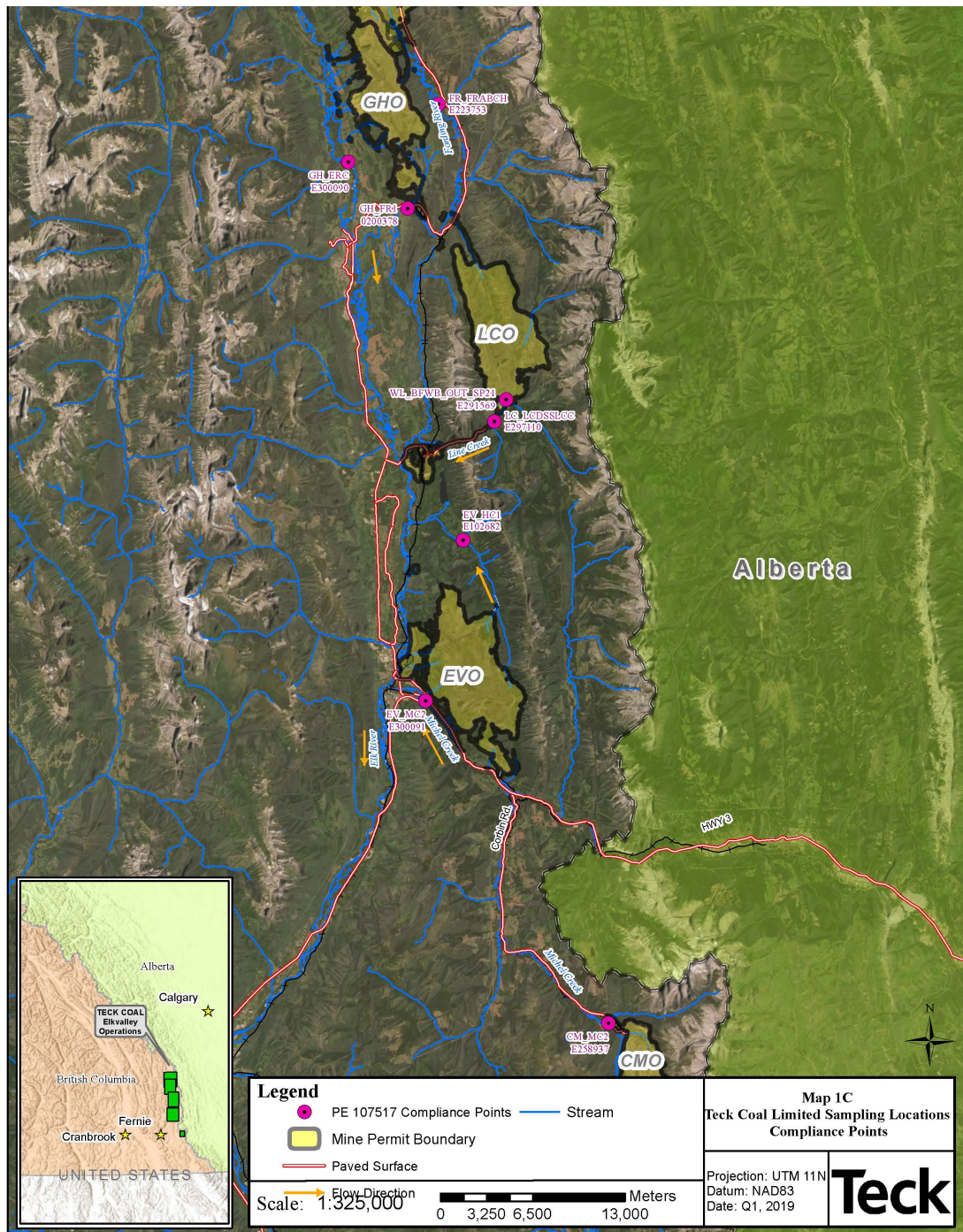
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Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)

A.J. Downie

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDIX 1C – Teck Coal Limited Sampling Locations Map – Compliance Points

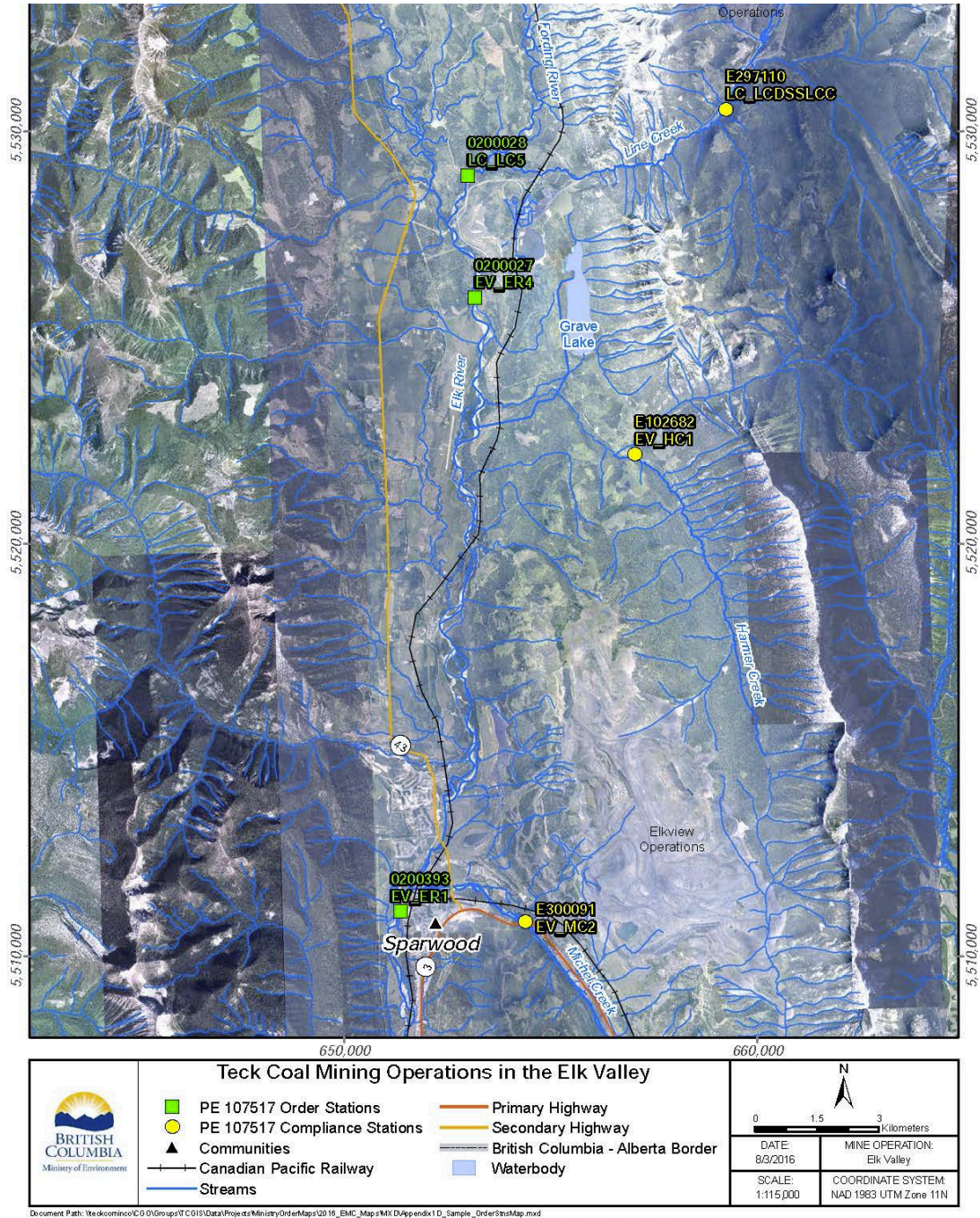


Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)

A.J. Downie

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDIX 1D – Teck Coal Limited Sampling Locations Map – Order Stations

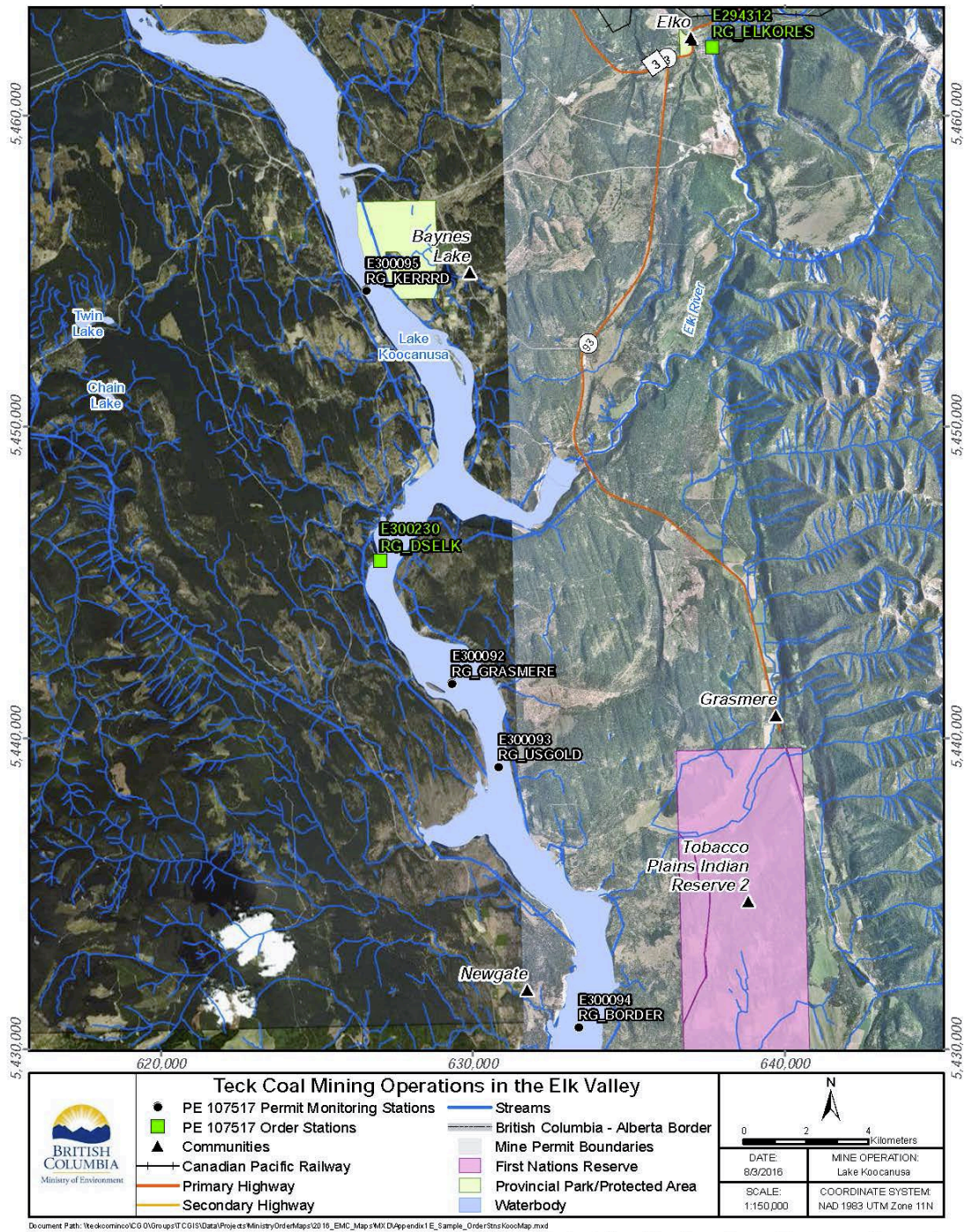


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APPENDIX 1E – Teck Coal Limited Sampling Locations Map – Koocanusa Reservoir



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Legend

- PE 107517 Compliance Points
- PE 107517 Monitoring Location
- PE 107517 Order Station
- Facility Locations
- Mine Permit Boundary
- Paved Surface
- Flow Direction
- Stream
- Intermittent Stream

Scale: 1:55,000

Teck Coal Limited Sampling Locations - Fording River Operations

Projection: UTM 11N
Datum: NAD83
Date: Q1, 2020

Teck

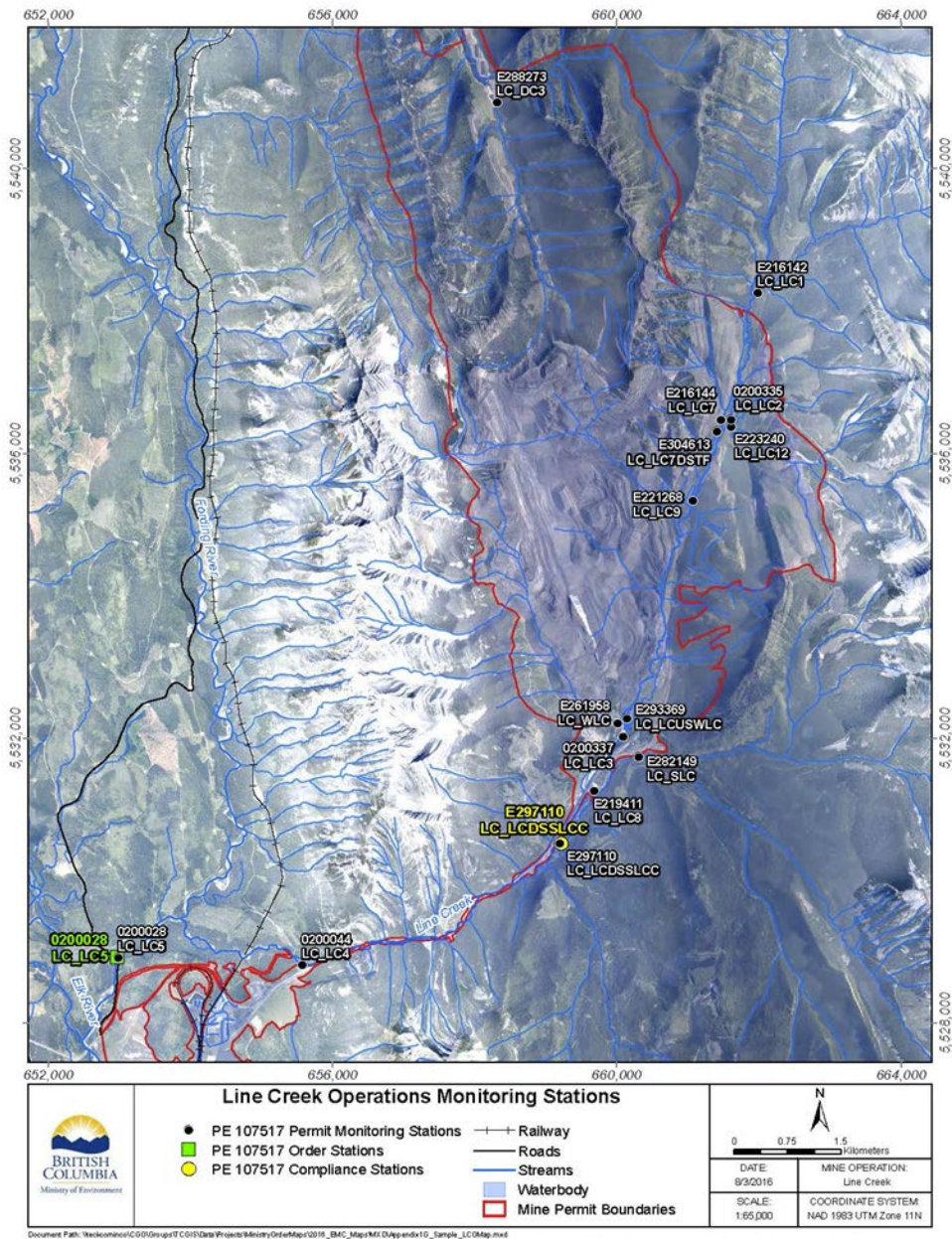
again

Permit Number: 107517

again

Permit Number: 107517

APPENDIX 1H – Teck Coal Limited Sampling Locations Map – Line Creek Operations Phase I

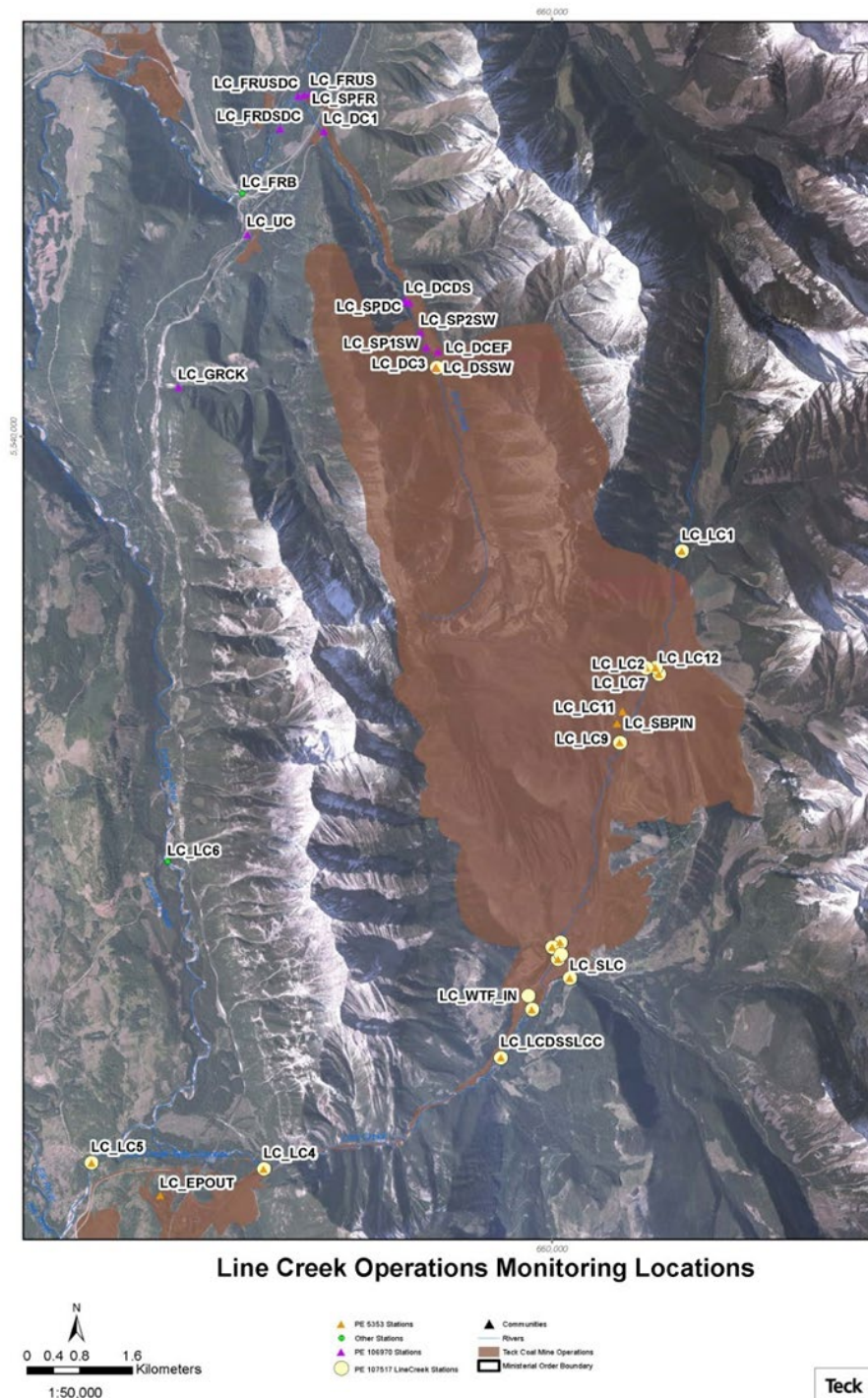


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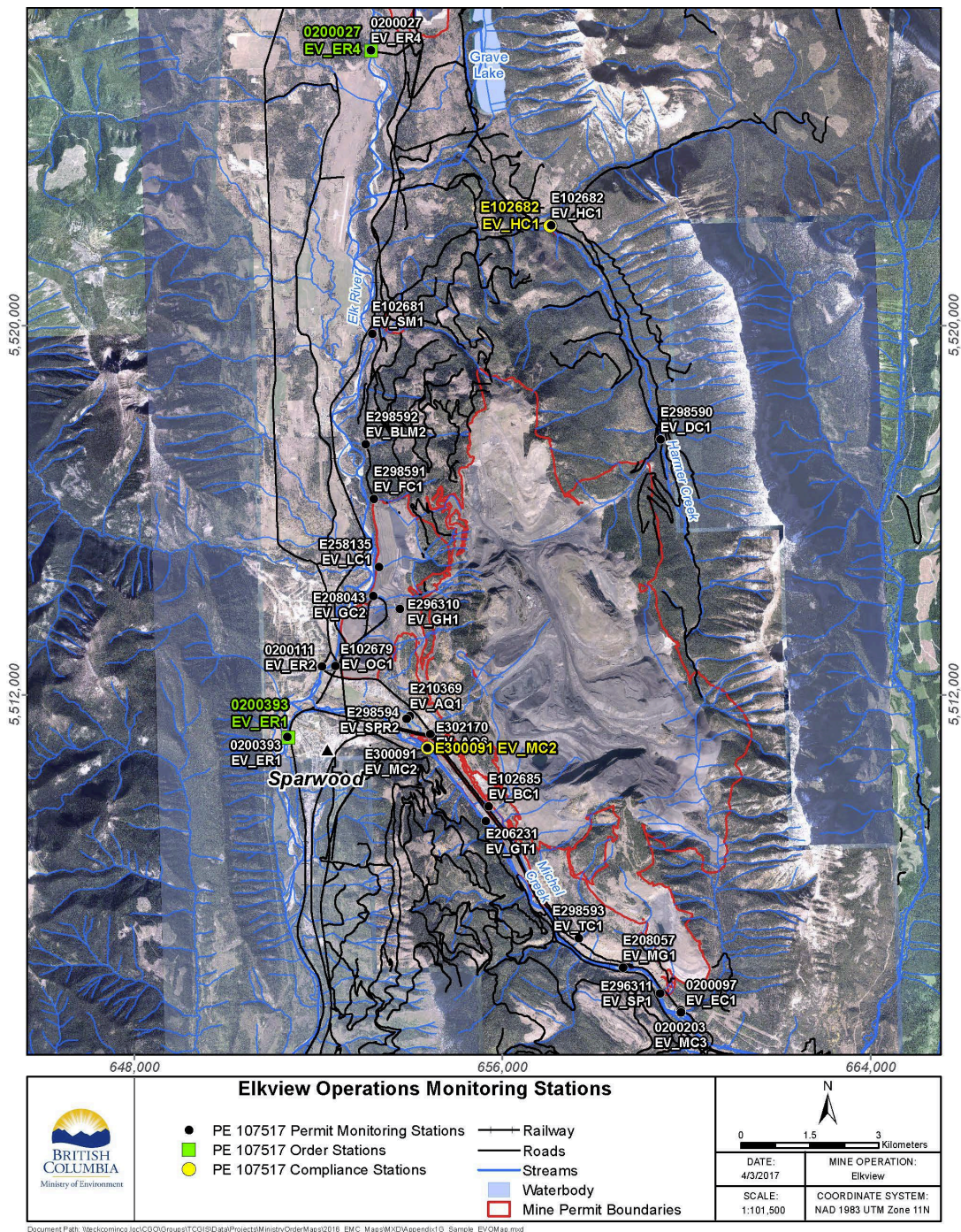
APPENDIX 1I – Teck Coal Limited Sampling Locations Map – Line Creek Operations Phase II



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APPENDIX 1J – Teck Coal Limited Sampling Locations Map – Elkview Operations

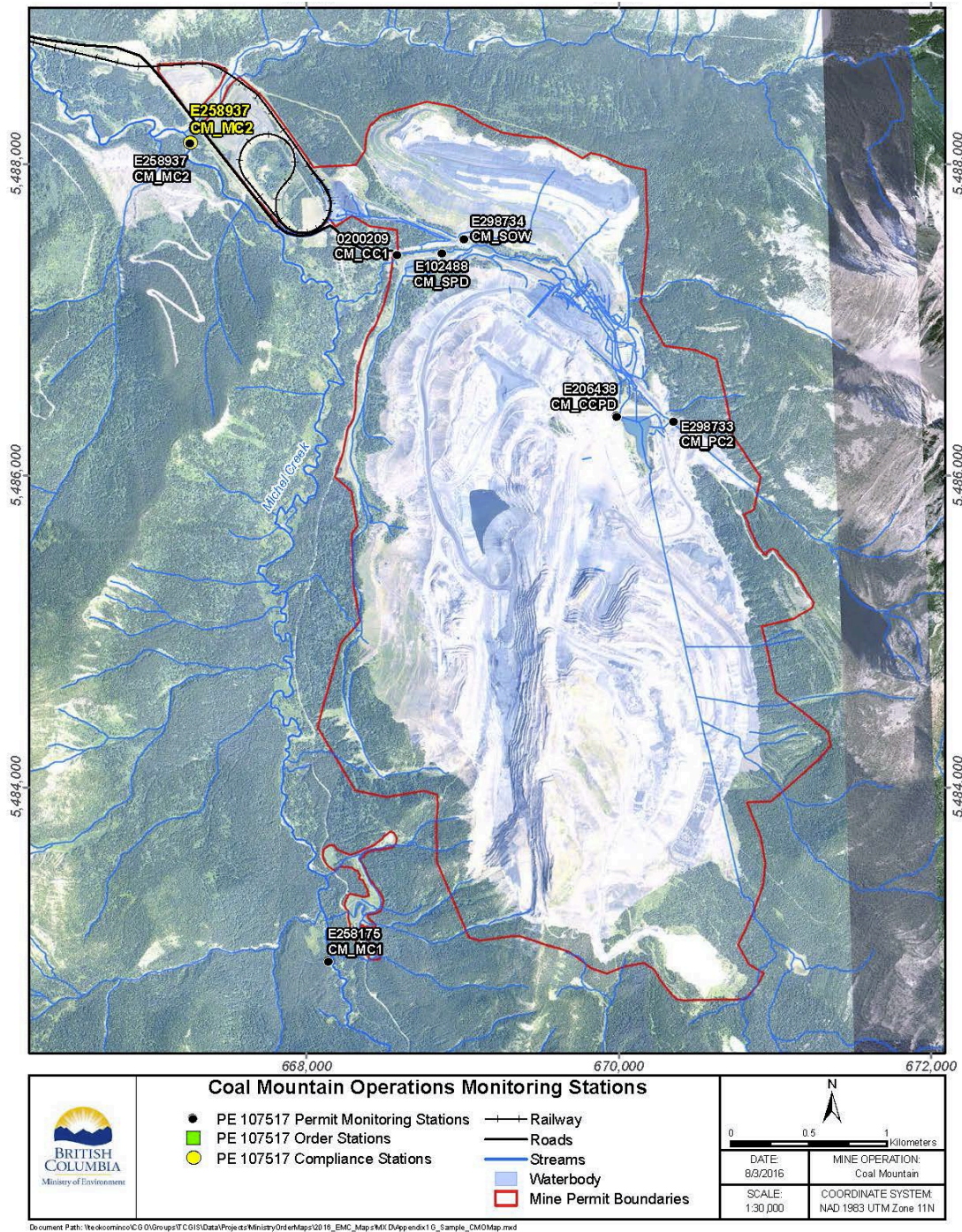


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APPENDIX 1K – Teck Coal Limited Sampling Locations Map – Coal Mountain



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APPENDIX 2: SURFACE WATER DISCHARGE AND RECEIVING ENVIRONMENT MONITORING PROGRAM

TABLE 10 - DESIGNATED AREA MONITORING PROGRAM – COMPLIANCE POINTS

	FRO – FORDING RIVER ~100m UPSTREAM OF CHAUNCEY CREEK (4)	GHO – FORDING RIVER ~205m DOWNSTREAM OF GREENHILLS CREEK	GHO – ELK RIVER ~220m DOWNSTREAM OF THOMPSON CREEK	LCO – LINE CREEK IMMEDIATELY DOWNSTREAM OF SOUTH LINE CREEK CONFLUENCE	EVO – HARMER SPILLWAY	EVO – MICHEL CREEK AT HWY 3 BRIDGE (4)	CMO – MICHEL CREEK 50m UPSTREAM OF ANDY GOODE CREEK
EMS Number	E223753	0200378	E300090	E297110	E102682	E300091	E258937
PARAMETER							
Field Parameters ^(a)	W/M	W/M	W/M	W/M	W/M	W/M	W/M
Conventional Parameters ^(b)	W/M	W/M	W/M	W/M	W/M	W/M	W/M
Major Ions ^(c)	W/M	W/M	W/M	W/M	W/M	W/M	W/M
Nutrients ^(d)	W/M	W/M	W/M	W/M	W/M	W/M	W/M
Total and Dissolved Metals Scans ^(e)	W/M	W/M	W/M	W/M	W/M	W/M	W/M
BOD	-	-	-	M	-	-	-
Chlorophyll- <i>a</i>	-	-	-	Three times annually, between July 15 & Sept 30 annually	-	-	-
Total Phosphorus	-	-	-	Every two weeks beginning Jun 15 through Sept 30, annually	-	-	-
Bromate	-	-	-	W/M	-	-	-
Hydrogen Peroxide	-	-	-	W/M	-	-	-

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.
- 4) Monitoring location appears in two monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in both Section 9 and Appendix 4.

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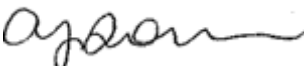

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TABLE 11 – DESIGNATED AREA MONITORING PROGRAM – ORDER STATIONS

	FR4 GH FR1	FR5 LC LC5	ER1 GH ER1	ER2 EV ER4	ER3 EV ER1	ER4 RG ELKORES	LK2 RG DSELK
	UPPER FORDING RIVER (DOWNSTREAM OF GREENHILLS CREEK)	LOWER FORDING RIVER (FORDING RIVER DOWNSTREAM OF LINE CREEK)	ELK RIVER UPSTREAM OF BOIVEN CREEK	ELK RIVER UPSTREAM OF GRAVE CREEK (FROM FORDING RIVER TO MICHEL CREEK)	ELK RIVER DOWNSTREAM MICHEL CREEK	ELK RIVER AT ELKO RESERVOIR	LAKE KOOCANUSA SOUTH OF THE ELK RIVER
EMS Number	0200378	0200028	E206661	0200027	0200393	E294912	E300230
PARAMETER							
Field Parameters ^(a)	W/M	W/M	W/M	W/M	W/M	W/M	M
Conventional Parameters ^(b)	W/M	W/M	W/M	W/M	W/M	W/M	M/EH
Major Ions ^(c)	W/M	W/M	W/M	W/M	W/M	W/M	M/EH
Nutrients ^(d)	W/M	W/M	W/M	W/M	W/M	W/M	M/EH
Total and Dissolved Metals Scan ^(e)	W/M	W/M	W/M	W/M	W/M	W/M	M/EH
Secchi depth and chlorophyll-a	-	-	-	-	-	-	M

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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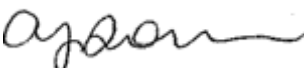

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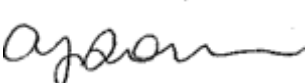
TABLE 12 - DESIGNATED AREA MONITORING PROGRAM – KOOCANUSA RESERVOIR RECEIVING ENVIRONMENT STATIONS

	KOOCANUSA RESERVOIR DOWNSTREAM OF KIKKOMAN CREEK	KOOCANUSA RESERVOIR WEST OF GRASMERE	KOOCANUSA RESERVOIR UPSTREAM OF GOLD CREEK	KOOCANUSA RESERVOIR UPSTREAM OF CANADA/US BORDER
<i>EMS Number</i>	<i>E300095</i>	<i>E300092</i>	<i>E300093</i>	<i>E300094</i>
PARAMETER				
Field Parameters _(a)	M	M	M	M
Conventional Parameters _(b)	M/EH	M/EH	M/EH	M
Major Ions _(c)	M/EH	M/EH	M/EH	M
Nutrients _(d)	M/EH	M/EH	M/EH	M
Total and Dissolved Metals Scan _(e)	M/EH	M/EH	M/EH	M
Secchi depth and chlorophyll-a	M	M	M	M

Note: sample collection is based upon access; ice on the reservoir may prevent sample collection, if this is the case, the monitoring report must include a reason in the report

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 13 - FORDING RIVER OPERATIONS DISCHARGE MONITORING PROGRAM

	TAILINGS SLURRY TO NORTH TAILINGS POND	TAILINGS SLURRY TO SOURTH TAILINGS POND	NORTH LOOP POND (h)	MAINTENANCE AND SERVICES SED POND	EAGLE POND DECANT (h)	CLODE POND (h)	SOUTH KILMARNOCK SED. POND – PHASE I (h)	SOUTH KILMARNOCK SED. POND – PHASE II (h)	HENRETTA PIT EFFLUENT INTO DIVERSION CULVERTS (j)	SMITH PONDS (h)	SWIFT PIT EFFLUENT TO FORDING RIVER	SWIFT- CATARACT SED. POND DOSED WITH ANTISCALANT TO FORDING RIVER (4;5)	LIVERPOOL SED PONDS TO FORDING RIVER (h)	POST SED PONDS TO FORDING RIVER (h)	LAKE MOUNTAIN SEDIMENT PONDS TO LAKE MOUNTAIN CREEK	FLOODPLAIN WIDENING SED. POND DECANT (h)
<i>EMS Number</i>	<i>E102475</i>	<i>E206660</i>	<i>E102476</i>	<i>E102478</i>	<i>E102480</i>	<i>E102481</i>	<i>E208394</i>	<i>E208395</i>	<i>E216781</i>	<i>E261897</i>	<i>E217403</i>	<i>E320694</i>	<i>E304835</i>	<i>E304750</i>	<i>E306924</i>	<i>E325311</i>
(h) In-pond sample <i>EMS</i> <i>Number</i>	-	-	<i>E310046</i>	-	<i>E310047</i>	<i>E310048</i>	<i>E310049</i>	<i>E310050</i>	-	<i>E310051</i>	-	-	<i>E310052</i>	<i>E310053</i>	-	<i>E325312</i>
PARAMETER																
Field Parameters (a)	-	-	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Conventional Parameters (b)	SA	SA	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Major Ions (c)	SA	SA	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Nutrients (d)	SA	SA	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Total and Dissolved Metals Scan (e)	SA	SA	M	M	M	M	M	M	M	M	M	M	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test (g)	-	-	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	-	Q	Q
48 hour <i>Daphnia</i> <i>magna</i> single concentration toxicity test (g)	-	-	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	-	Q	Q

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.
- 4) Monitoring location appears in two monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in both Section 9 and Appendix 5.
- 5) Samples are to be collected only when there is discharge via overflow from the FRO AWTF-S Swift Creek Intake. If the discharge is initiated because of a recirculation event at FRO-S AWTF, the monitoring program is not effective during the first four (4) hours of the recirculation event.

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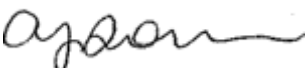
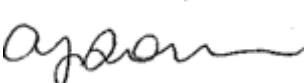

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TABLE 14 – FORDING RIVER OPERATIONS RECEIVING ENVIRONMENT AND OTHER MONITORING PROGRAM

	FORDING RIVER U/S OF KILMARNOCK CREEK	FORDING RIVER D/S OF FRO AWTF- S OUTFALL STRUCTURE (4)	FORDING RIVER ~525 m D/S OF CATARACT CREEK	FORDING RIVER D/S OF HENRETTA	FORDING RIVER U/S OF HENRETTA	HENRETTA CREEK AT MOUTH	HENRETTA CREEK UPSTREAM OF MCQUARRIE CREEK	FORDING RIVER NEAR FORDING ROAD	KILMARNOCK AT MOUTH
<i>EMS Number</i>	<i>0200201</i>	<i>E320695</i>	<i>E300071</i>	<i>0200251</i>	<i>E216777</i>	<i>E216778</i>	<i>E300096</i>	<i>E300097</i>	<i>0200252</i>
PARAMETER									
Field Parameters (a)	W/M	W/M	W/M	M	M	W/M	M	M	M
Conventional Parameters (b)	W/M	W/M	W/M	M	M	W/M	M	M	M
Major Ions (c)	W/M	W/M	W/M	M	M	W/M	M	M	M
Nutrients (d)	W/M	W/M	W/M	M	M	W/M	M	M	M
Total and Dissolved Metals Scan (e)	W/M	W/M	W/M	M	M	W/M	M	M	M

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.
- 4) Monitoring location appears in three monitoring tables in this permit, therefore monitoring data must be reported according to the requisite reporting requirements in Section 9 and Appendices 4 and 5.

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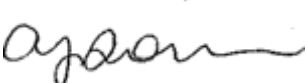
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TABLE 15 – GREENHILLS OPERATIONS DISCHARGE MONITORING PROGRAM

	TAILINGS POND WATER	GREENHILLS CREEK SED. POND DECANT (4)	THOMPSON CREEK SED. POND DECANT	PORTER CREEK SED. POND DECANT	WOLFRAM CREEK SED. POND DECANT	LEASK CREEK SED. POND DECANT	RAIL LOOP SED. POND DECANT	MICKELSON CREEK AT LRP ROAD	WADE CREEK AT LRP ROAD	WOLF CREEK SED. POND DECANT	WILLOW CREEK SED. POND DECANT
<i>EMS Number</i>	<i>E287438</i>	<i>E102709</i>	<i>E207436</i>	<i>0200385</i>	<i>E257795</i>	<i>E257796</i>	<i>E207437</i>	<i>0200388</i>	<i>E287433</i>	<i>E305855</i>	<i>E305854</i>
PARAMETER											
Field Parameters ^(a)	-	M	M	M	M	M	M	M	M	M	M
Conventional Parameters ^(b)	SA	M	M	M	M	M	M	M	M	M	M
Major Ions ^(c)	SA	M	M	M	M	M	M	M	M	M	M
Nutrients ^(d)	SA	M	M	M	M	M	M	M	M	M	M
Total and Dissolved Metals Scan ^(e)	SA	M	M	M	M	M	M	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test ^(g)	-	Q	Q	Q	Q	Q	-	-	Q	Q	Q
48 hour <i>Daphnia magna</i> single concentration toxicity test ^(g)	-	Q	Q	Q	Q	Q	-	-	Q	Q	Q

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.
- 4) Monitoring location appears in two monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in both Section 9 and Appendix 5.

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Mining Authorizations

TABLE 16 – GREENHILLS OPERATIONS RECEIVING ENVIRONMENT MONITORING PROGRAM

	ELK RIVER UPSTREAM OF GREENHILLS OPERATIONS	THOMPSON CREEK AT LRP ROAD ³	COUGAR CREEK AT LRP ROAD	BRANCH F AT LRP ROAD	NO NAME CREEK (GH_NNC)	ELK RIVER SIDE CHANNEL D/S WOLFRAM CREEK (GH_ER1A)	ELK RIVER D/S OF THOMPSON CREEK	ELK RIVER SIDE CHANNEL U/S WOLFRAM CREEK
<i>EMS Number</i>	<i>0200389</i>	<i>E102714</i>	<i>E287432</i>	<i>E287437</i>	<i>E305875</i>	<i>E305876</i>	<i>E305877</i>	<i>E305878</i>
PARAMETER								
Field Parameters _(a)	M	M	M	M	M	M	M	M
Conventional Parameters _(b)	M	M	M	M	M	M	M	M
Major Ions _(c)	M	M	M	M	M	M	M	M
Nutrients _(d)	M	M	M	M	M	M	M	M
Total and Dissolved Metals Scan _(e)	M	M	M	M	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test _(g)	-	Q	-	-	-	-	-	-
48 hour <i>Daphnia magna</i> single concentration toxicity test _(g)	-	Q	-	-	-	-	-	-

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) The requirement for monitoring at this site will be re-evaluated upon acceptance of the GH0 LAEMP study design.
- 4) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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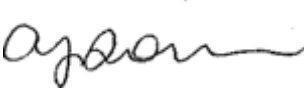

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TABLE 17 - LINE CREEK OPERATIONS PHASE I DISCHARGE MONITORING PROGRAM

	NO NAME CREEK POND EFFLUENT TO LINE CREEK	MSA NORTH PONDS EFFLUENT TO LINE CREEK	MSA NORTH PONDS EFFLUENT TO LINE CREEK ALTERNATE (4)	CONTINGENCY TREATMENT SYSTEM EFFLUENT TO LINE CREEK (r)
EMS Number	E221268	E216144	E304613	E219411
PARAMETERS				
Field Parameters (a)	M	M	M	M
Conventional Parameters (b)	M	M	M	M
Major Ions (c)	M	M	M	M
Nutrients (d)	M	M	M	M
Total and Dissolved Metals Scan (e)	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test (g)	Q	Q	Q	-
48 hour <i>Daphnia magna</i> single concentration toxicity test (g)	Q	Q	Q	-

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.
- 4) Monitoring location E304613 to be used as an alternate for E216144, as required.

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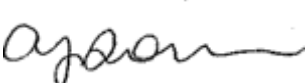
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TABLE 18 - LINE CREEK OPERATIONS PHASE II DISCHARGE MONITORING PROGRAM

	LCO DRY CREEK SEDIMENTATION PONDS EFFLUENT TO DRY CREEK VIA THE RETURN CHANNEL	LCO DRY CREEK SEDIMENTATION PONDS EFFLUENT TO FORDING RIVER VIA OUTFALL (WHEN IN USE)	DIVERSION STRUCTURE SPILLWAY (WHEN IN USE)	SEDIMENTATION POND 1 SPILLWAY (WHEN IN USE)	SEDIMENTATION POND 2 SPILLWAY (WHEN IN USE)	SEDIMENTATION POND 3 SPILLWAY (WHEN CONSTRUCTED AND IN USE)
<i>EMS Number</i>	<i>E295211</i>	<i>E295231</i>	<i>E295313</i>	<i>E295314</i>	<i>E295315</i>	<i>E295316</i>
<i>Teck ID</i>	<i>LC_SPDC</i>	<i>LC_SPFR</i>	<i>LC_DSSW</i>	<i>LC_SPISW</i>	<i>LC_SP2SW</i>	<i>LC_SP3SW</i>
PARAMETERMONITORING FREQUENCY						
Field Parameters ^(a)	BP-W/M ⁽ⁱ⁾	W/M	D*/W	D*/W	D*/W	D*/W
Conventional Parameters ^(b)	BP-W/M	W/M	D*/W	D*/W	D*/W	D*/W
Major Ions ^(c)	BP-W/M	W/M	D*/W	D*/W	D*/W	D*/W
Nutrients ^(d)	BP-W/M	W/M	D*/W	D*/W	D*/W	D*/W
96-hour LC ₅₀ Rainbow Trout ^(g)	Q	Q	-	-	-	-
48-hour LT ₅₀ <i>Daphnia magna</i> ^(g)	Q	Q	-	-	-	-
Selenium Species ⁽	BP-W/M	-	-	-	-	-
Chlorophyll- <i>a</i> ^(h)	BP-W/M	-	-	-	-	-

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 19 – LINE CREEK OPERATIONS PHASE I RECEIVING ENVIRONMENT MONITORING PROGRAM

	LINE CREEK UPSTREAM OF PROCESS PLANT	LINE CREEK DOWNSTREAM OF WEST LINE CREEK	LINE CREEK UPSTREAM OF ROCK DRAIN	LINE CREEK UPSTREAM OF WLC BELOW ROCK DRAIN	LINE CREEK UPSTREAM MSA NORTH PIT	SOUTH LINE CREEK	WEST LINE CREEK	NORTH HORSESHOE CREEK NEAR MOUTH
EMS Number	0200044	0200337	0200335	E293369	E216142	E282149	E261958	E223240
PARAMETER								
Field Parameters ^(a)	W/M	W/M	M	M	M	M	M	M
Conventional Parameters ^(b)	W/M	W/M	M	M	M	M	M	M
Major Ions ^(c)	W/M	W/M	M	M	M	M	M	M
Nutrients ^(d)	W/M	W/M	M	M	M	M	M	M
Nitrate	-	-	-	W	-	-	W	-
Total and Dissolved Metals Scan ^(e)	W/M	W/M	M	M	M	M	M	M
BOD	-	W/M	M	M	-	M	-	-
Total Sulphide	-	W/M	-	-	-	-	-	-
Bromate	W/M	W/M	-	-	-	-	-	-
Hydrogen peroxide (Teck Internal Lab Results)	W/M	W/M	-	-	-	-	-	-

- 1) Refer to Table 23, Appendix 3, for abbreviation description.
- 2) Refer to Table 24, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)


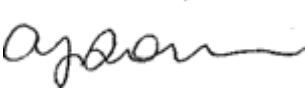

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TABLE 20 – LINE CREEK OPERATIONS PHASE II RECEIVING ENVIRONMENT MONITORING PROGRAM

	EAST TRIBUTARY OF LCO DRY CREEK	LCO DRY CREEK UPSTREAM OF EAST TRIBUTARY CREEK	LCO DRY CREEK DOWNSTREAM OF SEDIMENTATION PONDS	LCO DRY CREEK NEAR MOUTH	UNNAMED CREEK	GRACE CREEK UPSTREAM OF THE CP RAIL TRACKS	FORDING RIVER 100M UPSTREAM OF THE CONVEYANCE OUTFALL (K)	FORDING RIVER UPSTREAM OF LCO DRY CREEK, 100M DOWNSTREAM OF THE CONVEYANCE OUTFALL TO FORDING RIVER (K)	FORDING RIVER DOWNSTREAM OF LCO DRY CREEK	CHAUNCEY CREEK
EMS Number	E288274	E288273	E295210	E288270	E295213	E288275	E295232	E288271	E288272	E295214
Teck ID	LC_DCEF	LC_DC3	LC_DCDS	LC_DC1	LC_UC	LC_GRCK	LC_FRUS	LC_FRUSDC	LC_FRDSDC	RG_CH1
PARAMETER	MONITORING FREQUENCY									
Field Parameters(a)	M	BP- W/M	BP-W/M(g)	W/M	M	M	M	M	W/M	M
Conventional Parameters(b)	M	BP- W/M	BP-W/M	W/M	M	M	M	M	W/M	M
Major Ions (c)	M	BP- W/M	BP-W/M	W/M	M	M	M	M	W/M	M
Nutrients (d)	M	BP- W/M	BP-W/M	W/M	M	M	M	M	W/M	M
Selenium Species	-	BP- W/M	BP-W/M	-	-	-	-	-	-	-
Chlorophyll-a	M	BP- W/M	BP-W/M	W/M	-	-	-	-	-	-

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

Date issued: November 19, 2014
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(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

TABLE 21 - ELKVIEW OPERATIONS DISCHARGE MONITORING PROGRAM

	WESTFORK TAILINGS IMPOUNDMENT DISCHARGE TO GROUND	ERICKSON CREEK (@MOUTH) DISCHARGE TO MICHEL CREEK	SOUTH PIT CREEK SEDIMENTATON POND DISCHARGE TO MICHEL CREEK	MILLIGAN CREEK SEDIMENTATION POND DISCHARGE TO MICHEL CREEK	GATE CREEK SEDIMENTATION POND DISCHARGE TO MICHEL CREEK	BODIE CREEK SEDIMENTATION POND DISCHARGE TO MICHEL CREEK	AQUEDUCT CREEK CONTROL STRUCTURE TO AQUEDUCT CREEK
<i>EMS Number</i>	<i>E296310</i>	<i>0200097</i>	<i>E296311</i>	<i>E208057</i>	<i>E206231</i>	<i>E102685</i>	<i>E302170</i>
PARAMETER							
Field Parameters ^(a)	SA	M	M	M	M	M	M
Conventional Parameters ^(b)	SA	M	M	M	M	M	M
Major Ions ^(c)	SA	M	M	M	M	M	M
Nutrients ^(d)	SA	M	M	M	M	M	M
Total and Dissolved Metals Scan ^(e)	SA	M	M	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test ^(g)	-	Q	Q	Q	Q	Q	Q
48 hour <i>Daphnia magna</i> single concentration toxicity test	-	Q	Q	Q	Q	Q	Q

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)

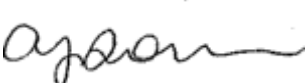
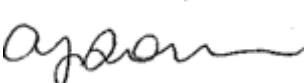

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Mining Authorizations

TABLE 22 - ELKVIEW OPERATIONS DISCHARGE MONITORING PROGRAM (CONTINUED)

	OTTO CREEK (@MOUTH) DISCHARGE TO ELK RIVER	GODDARD CREEK SEDIMENTATION POND DECANT DISCHARGE TO GODDARD MARSH VIA ELK RIVER	LINDSAY CREEK INFILTRATION BASIN DISCHARGE TO GROUND	DRY CREEK SEDIMENTATION POND DECANT TO HARMER CREEK	6 MILE CREEK SEDIMENTATION POND DECANT DISCHARGE TO ELK RIVER
<i>EMS Number</i>	<i>E102679</i>	<i>E208043</i>	<i>E258135</i>	<i>E298590</i>	<i>E102681</i>
PARAMETER					
Field Parameters ^(a)	M	M	M	M	M
Conventional Parameters ^(b)	M	M	M	M	M
Major Ions ^(c)	M	M	M	M	M
Nutrients ^(d)	M	M	M	M	M
Total and Dissolved Metals Scan ^(e)	M	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test ^(g)	Q	Q	Q	Q	Q
48 hour <i>Daphnia magna</i> single concentration toxicity test ^(g)	Q	Q	Q	Q	Q

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)




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Mining Authorizations

TABLE 23– ELKVIEW OPERATIONS RECEIVING ENVIRONMENT AND OTHER MONITORING PROGRAM

	MICHEL CREEK UPSTREAM OF ERICKSON CREEK	ELK RIVER UPSTREAM OF MICHEL CREEK	BALMER CREEK @ CFI ROAD	FENNELON CREEK @ CFI ROAD	SPRING CREEK @ MOUTH WITH AQUADUCT CREEK	THRESHER CREEK @ MILLIGAN ROAD
<i>EMS Number</i>	<i>0200203</i>	<i>0200111</i>	<i>E298592</i>	<i>E298591</i>	<i>E298594</i>	<i>E298593</i>
PARAMETER						
Field Parameters ^(a)	W/M	M	M	M	M	M
Conventional Parameters ^(b)	W/M	M	M	M	M	M
Major Ions ^(c)	W/M	M	M	M	M	M
Nutrients ^(d)	W/M	M	M	M	M	M
Total and Dissolved Metals Scan ^(e)	W/M	M	M	M	M	M

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



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for Director, *Environmental Management Act*
Mining Authorizations

TABLE 24– COAL MOUNTAIN OPERATIONS DISCHARGE MONITORING PROGRAM

	DECANT DISCHARGE FROM MAIN INTERCEPTOR SEDIMENTATION PONDS (h)	DECANT DISCHARGE FROM CORBIN SEDIMENTATION POND (h)	PENGELLY CHANNEL DECANT (h)	SOWCHUCK SUMP
<i>EMS Number</i>	<i>E102488</i>	<i>E206438</i>	<i>E298733</i>	<i>E298734</i>
PARAMTER				
Field Parameters ^(a)	M	M	M	M
Conventional Parameters ^(b)	M	M	M	M
Major Ions ^(c)	M	M	M	M
Nutrients ^(d)	M	M	M	M
Total Metals Scan ^(e)	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test ^(g)	Q	Q	Q	-
48 hour LT ₅₀ <i>Daphnia magna</i> single concentration toxicity test ^(g)	Q	Q	Q	-

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)


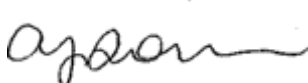

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Mining Authorizations

TABLE 25 – COAL MOUNTAIN OPERATIONS RECEIVING ENVIRONMENT MONITORING PROGRAM

	MICHEL CREEK UPSTREAM OF OPERATIONS	CORBIN CREEK NEAR CONFLUENCE WITH MICHEL CREEK
<i>EMS Number</i>	<i>E258175</i>	<i>0200209</i>
PARAMETER		
Field Parameters _(a)	M	W/M
Conventional Parameters _(b)	M	W/M
Major Ions _(c)	M	W/M
Nutrients _(d)	M	W/M
Total Metals Scan _(e)	M	W/M

- 1)
- Refer to Table 26, Appendix 3, for abbreviation description.
- 2)
- Refer to Table 27, Appendix 3, for explanatory notes.
- 3)
- Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)

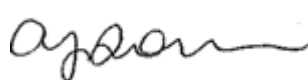

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Mining Authorizations

APPENDIX 3: MONITORING PROGRAM NOTES AND EXPLANATIONS

Table 26 - Abbreviations for Surface Water Monitoring Program

A	Annual frequency
3X/W	Sampling three times per week
1X/2W	Sampling once every two weeks
1X/6W	Six week in-stream cycle
TA	Twice annually
C	Continuous Monitoring refer to (f) Table 24
D	Daily frequency
D*/W	One sample within the first 24 hours when actively discharging at spillway, then weekly thereafter for continued discharge from the spillways. Discharge from the spillway(s) occurs for flows greater than a 1:10 year, 24-hour storm event.
M	Monthly frequency
M/EH	<p>Monthly frequency of one epilimnetic composite of water sampled from three depths (e.g. 1m, 5m,10m) and another hypolimnetic composite of water sampled from three depths (e.g. 20m,32m,45m)</p> <p>Stratification into an epilimnion and hypolimnion will be confirmed wherever a thermocline (defined as a 1°C change over 1 meter depth) is recorded. This temperature differential must be sustained in order to constitute stratification. Where stratified, one composite sample will be formed from three evenly spaced grab samples in the epilimnion and one composite sample similarly from the hypolimnion. Where unstratified, samples will be collected 3 m from the surface, 3 m from the substrate and at the mid-point of the water column. These samples will be averaged to comprise a composite sample.</p>
Q	Quarterly frequency
Q*	Toxicity testing done weekly until one year after commissioning is completed, at which time testing must be done quarterly.
SA	Semi-Annual frequency (twice per year), SA sampling schedules must coincide with the monthly sampling schedule for sampling locations where both sampling frequencies are required.
W/M	Weekly frequency March 15 – July 15, monthly during the rest of the year.
BP-W/M	Weekly frequency March 15 to at least August 31 during bypass of the LCO Dry Creek Water Management System, monthly during the rest of the year, depending on unexpected monitoring results that indicate potential ortho-P uptake or the generation of organic selenium species.
BOD	5-day Biochemical Oxygen Demand
EPH	Extractable Petroleum Hydrocarbons, a combination of HEPH (C19-32) & LEPH (C10-19)
TSS	Total Suspended Solids

Date issued: November 19, 2014
 Date amended: November 19, 2021
 (most recent)

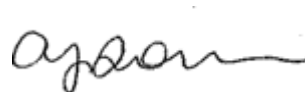


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 Mining Authorizations

Table 27- Surface Water Monitoring Program: Explanatory Notes

a	Field Parameters must include water temperature, specific conductance, dissolved oxygen, pH; for Koocanusa Reservoir locations this includes vertical profiles of dissolved oxygen and temperature
b	Conventional Parameters must include specific conductance, total dissolved solids, total suspended solids, hardness, alkalinity, dissolved organic carbon, total organic carbon, and turbidity.
c	Major Ions must include bromide, fluoride, calcium, chloride, magnesium, potassium, sodium, sulphate.
d	Nutrients must include ammonia, nitrate, nitrite, TKN, orthophosphate, total phosphorus.
e	Dissolved Metals Scan must include aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, and zinc. Total Metals Scan must include aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, and zinc.
f	Flow monitoring locations may be changed through approved flow monitoring plan and must follow latest approved plan. Flow measurements must be taken in accordance with Section 8.1.2.2 or in accordance with an approved Flow Monitoring Plan.
g	Acute toxicity tests must coincide with water quality sampling and must be implemented in accordance with the toxicity testing program approved by the director. Teck shall collect samples when ponds are decanting within the permitted sampling frequency
h	If the discharge point is not decanting to the receiving environment, water quality samples must be taken just inside the decant point for all parameters, with the exception of toxicity.
i	Selenium Speciation must include total selenium, dissolved selenium, selenate (Se (VI)), selenite (Se (IV)), methylseleninic acid (MeSe (IV)), selenocyanate (SeCN), selenomethionine (SeMe), selenosulfate, dimethylselenoxide (DMSeO), methaneselenonic acid (MeSe(VI)) and unknown selenium species.
j	Field observations of algae growth (presence/absence and photograph)
k	Monitoring at this location is not required until commissioning of the conveyance works authorized in section 2.9 for the discharge to the Fording River. The permittee must notify the Ministry 1 year prior to discharge through the outfall to discuss initiation of monitoring at this location.
o (LCO)	Water temperature, dissolved oxygen, pH must be continuously monitored.
r (LCO)	To be sampled only when in use.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDIX 4: SELENIUM AND NITRATE TREATMENT FACILITIES


APPENDIX 4A – Selenium and Nitrate Treatment Facility General Operational Requirements

APPENDIX 4B – West Line Creek Active Water Treatment Facility (AWTF)

APPENDIX 4C – Elkview Operations Saturated Rock Fill (EVO SRF)

APPENDIX 4D – Fording River Operations – South (FRO-S) AWTF

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDIX 4A – Selenium and Nitrate Treatment Facility General Operational Requirements

This section includes requirements that apply to all selenium and nitrate treatment facilities. Subsequent sections include facility-specific requirements.

4A1 COMMISSIONING

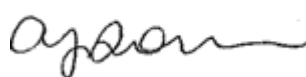
For the purpose of this permit, commissioning means bringing selenium and nitrate treatment facility works into operation. A maximum of 120 days in forward flow during commissioning is considered a reasonable time to undertake operational refinement or adjustment of works to optimize efficiency and/or effluent quality prior to moving to the operational phase of the treatment facility. The permittee must notify the director when the facility commences forward flow and commissioning must be completed within 120 days of commencing forward flow. Alternative commissioning periods must be approved by the director.

During pre-commissioning and commissioning of a treatment facility, the authorized discharge limits and associated site performance objectives for each specific facility included in the subsequent sections do not apply, but the discharge is required to be non-acutely toxic as per Section 6.2 and the downstream Compliance Point compliance limits apply. During the time that commissioning is underway, periodic reporting on the status of commissioning must be provided to the satisfaction of the director. Once the commissioning phase is complete, or the maximum approved commissioning period has ended, whichever occurs first, the operational phase begins, and the permittee must notify the director.

4A2 COMMISSIONING PLAN

A Commissioning Plan for each selenium and nitrate treatment facility must be prepared by a Qualified Professional, submitted to the director and implemented prior to commencement of the discharge from the treatment facility while in forward flow during the commissioning phase. The Commissioning Plan must include but is not necessarily limited to operational procedures required to commission and to start-up following a shut-down of the water treatment facility, including sequencing, estimated timeline of steps, and any additional monitoring and reporting required to demonstrate that no adverse environmental impacts result from commissioning. The

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Commissioning Plan must, at a minimum, include the operational monitoring for each specific facility as required by subsequent sections.

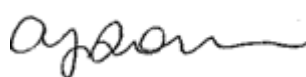
4A3 **OPERATIONS PLAN**

An Operations Plan for each selenium and nitrate treatment facility and the associated authorized works in Appendix 4 must be prepared by a Qualified Professional, submitted to the director and implemented prior to commencement of the discharge from the treatment facility during the operational phase. The Operations Plan must include but is not necessarily limited to:

- i. The facility operator's manual, with provision for its continual improvement;
- ii. An overview of the planned maintenance program which includes an inventory of facility components and authorized replacement parts, and a detailed description of inspection, repair and replacement frequency for facility components;
- iii. Documentation to verify that the facility is operated at all times within specifications and in a manner to ensure compliance with this authorization and other applicable legislation;
- iv. Procedures for safely shutting down the treatment facility; and
- v. Actions to be taken if effluent quality fails to meet the requirements of this permit;
- vi. Contingency planning which describes built-in redundancy of the facility and outlines measures to prevent emergency conditions from occurring; and
- vii. Key metrics to be used to demonstrate the performance of the treatment facility relative to the intended performance.

The Operations Plan must be reviewed and updated following the first year of facility operations and as needed thereafter to assess its appropriateness for the authorized works, discharges and conditions. Results of the initial review must be provided to the director in the commissioning report prepared under Section 4A6 of this permit. Changes in procedures may be required by the director on the basis of this or later assessments, the operational records for the treatment facility and/or the results of discharge and receiving environment monitoring under Section 8. Any significant update to the plan must be submitted to the director within 30 days of adoption. Minor updates

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

must be summarized in the quarterly report for the time period when the minor update was made.

4A4 **PROCESS MODIFICATIONS**

The permittee must notify the director in writing, prior to implementing changes to any process that may adversely affect the quality and/or quantity of the discharge from the selenium and nitrate treatment facilities. Notwithstanding notification under this Section, permitted levels must not be exceeded.

4A5 **NEW WORKS**

The director may require upgrading of the selenium and nitrate treatment works and disposal facilities based on monitoring results, and/or any other pertinent information. Plans and specifications for new pollution treatment works and upgrades to existing works must be submitted to the director as an amendment application. All new works must be approved before a discharge from the works commences.

4A6 **SITE SPECIFIC ENVIRONMENTAL EMERGENCY RESPONSE PLAN**

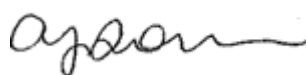
A Site-Specific Environmental Emergency Response Plan must be prepared for all selenium and nitrate treatment facilities. The plan must be submitted to the director prior to commencement of the discharge from the selenium and nitrate treatment facilities.

The plan must include, but is not limited to:

- i. A description of measures to mitigate any health or environmental impacts, if emergencies occur;
- ii. Specific reference to the Spill Reporting Regulation; and
- iii. Instructions for staff in the event of an emergency, including contact information for local authorities (fire, police, public health), Emergency Management BC, and the director.

Any significant update to the plan must be submitted to the director within 30 days of adoption. Minor updates must be summarized in the quarterly report for the time period when the minor update was made.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

4A7 **DISCHARGE MONITORING**

The permittee must sample the parameters at the sampling sites at the specific frequencies as defined in subsequent sections in Appendix 4. The influent and discharge water sampling sites are located approximately as shown in subsequent sections in Appendix 4. Sampling and analytical procedures in Section 8.1.2 apply to the monitoring required per Appendix 4 of this permit.

4A8 **COMMISSIONING REPORT**

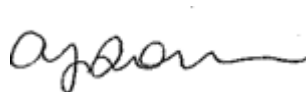
Within 12 months of finalizing the commissioning phase of the selenium and nitrate treatment facility, the permittee must submit a commissioning report, prepared by a Qualified Professional to the director. The report must document the results of performance monitoring and system optimization over the first year of operations at the facility and recommend any necessary system improvements.

4A9 **QUARTERLY TREATMENT PERFORMANCE REPORT**

The permittee must submit a quarterly treatment performance report to the director within 30 days of the end of the quarter in which the samples were collected. The quarterly treatment performance report must include the following for each water treatment facility:

- i. Effluent water quality results used to calculate monthly averages for the limits in Section 2 and Appendix 4, if applicable;
- ii. Calculated rolling 30-day cumulative total consecutive hours in recirculation for each day of the quarter;
- iii. A summary of timing and duration of authorized and unauthorized bypass events (i.e., full recirculation events) and routine and enhanced monitoring conducted during each bypass event.
- iv. Effluent water quality results exceeding limits and targets or other criteria, such as daily maximums or as specified by the director;
- v. Facility throughput and availability;
- vi. Selenium and nitrate load removal;
- vii. A summary of selenium speciation data;
- viii. Identification of all missing data and all QA/QC issues;

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations


- ix. All toxicity test results and raw laboratory data sheets for all mortality results;
- x. All reportable spills or other incidents related to water quality, occurring in the quarter;
- xi. A summary of operational and/or performance highlights and trends from the quarter, including key performance indicators;
- xii. Effluent water quality results exceeding alarm level 3 at the effluent retention pond;
- xiii. Explanation of the most probable cause(s) of any non-compliances;
- xiv. All measures taken to reduce or eliminate non-compliances; and
- xv. Any additional sampling results for the compliance points identified in Section 2 obtained for any reason, whether compliance, maintenance, or operational purposes. All test data must be reported within 30 days of the end of the quarter in which sampling occurred. These additional results may be reported in summary form. Further information on the testing event may be requested in writing by the director.

Results from samples collected in the last month of the quarter that are not available must be included in the following quarterly report. Any deviation from the information listed in this section must be communicated in the quarterly report and include rationale for the changes.

4A10 **ANNUAL TREATMENT PERFORMANCE REPORT**

The permittee must submit an annual treatment performance report to the director by March 31 of each year following the data collection calendar year. The report may include all facilities, though discussion for each facility must be distinct. Alternatively, the permittee may submit a series of reports. Each deliverable should not exceed manageable file sizes.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



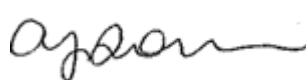
A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

The report must include the following for each water treatment facility:

- i. A summary of facility performance compared to the key performance metrics listed in the Operations Plan;
- ii. Influent sources and flow rates, including alternate sources;
- iii. Selenium and nitrate load removal;
- iv. Quantities of reagents used and residuals generated;
- v. Details on continuous improvement initiatives;
- vi. A description of any incidents including process upsets, spills, issues with and bypasses of the Authorized Works, including recirculation events;
- vii. A summary of all non-compliances with the requirements of Appendix 4, submitted in an Annual Status Form;
- viii. A map of monitoring locations with EMS and permittee descriptors;
- ix. A summary and evaluation of key operational and receiving environment monitoring data associated with the selenium and nitrate treatment facilities and all analytical results from the monitoring plans in Appendix 4 for the reporting year. Data must be suitably tabulated (i.e., excel spreadsheets), with appropriate graphs and comparison of results to limits, Approved and Working Water Quality Guidelines, Site Performance Objectives, or other criteria and benchmarks as specified by the director;
- x. If Site Performance Objectives in Appendix 4 are exceeded the permittee must provide an interpretation of significance, and the status of corrective actions and/or ongoing investigations;
- xi. All acute toxicity test-specific reports from the laboratory and an interpreted summary and discussion of results, including recommendations and all subsequent actions;
- xii. All acute toxicity test lab reports must include data and/or observations for hardness, alkalinity, pH, temperature, and formation of precipitate either in the vessel or on the organism.

A summary of all QA/QC issues during the year.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
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Mining Authorizations

APPENDIX 4B – West Line Creek (WLC) AWTF

Additional requirements are detailed in Appendix 4A.

4B1 AUTHORIZED DISCHARGES

This section applies to the discharge of effluent from the West Line Creek Active Water Treatment Facility (WLC AWTF) Phase 1 to Line Creek. The WLC AWTF influent is comprised of contact water from waste rock piles and non-hazardous leachate from the WLC AWTF residual waste landfill. The site reference number for this discharge is E291569 (WL_BFWB_OUT_SP21) as shown in Appendix 4B4.

4B1.1 The maximum authorized rate of discharge is 8,300 cubic meters per day.

4B1.2 The treated effluent discharged to Line Creek must always not be acutely toxic, as per Section 6.2. The characteristics of the discharge at the Buffer Pond Outfall (E291569) must not exceed:

PARAMETER	Daily Maximum Concentration
Ammonia (as N)	1.0 mg/L
Biological Oxygen Demand	25 mg/L
pH Range	6.5-8.5 pH units
Nitrate (as N)	3.0 mg/L
Total Phosphorus	0.3 mg/L
Total Selenium	20 µg/L, Monthly Average
Total Suspended Solids	10.0 mg/L
Antiscalant	25 mg/L, two-minute time weighted average

4B1.3 This discharge is authorized from Authorized Works which are the West Line Creek intake structure and pipeline, active water treatment plant, the advanced oxidation process facility, combined Line Creek intake and outfall structure and pipeline, infrastructure associated with transferring leachate influent from the biosolids residual management facility, buffer pond, buffer pond overflow spillway and wet pond, and groundwater diversion, and related appurtenances.

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(most recent)



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4B1.4 The location of the facilities from which the discharge originates and the location of the point of discharge is District Lot 6772, District Lot 4588, Kootenay Land District.

4B2 **SITE PERFORMANCE OBJECTIVES**

Additional requirements for WLC AWTF are detailed in Appendix 4A.

4B2.1 The following Site Performance Objectives are established for Line Creek immediately downstream of the confluence with South Line Creek. The site reference number where the Site Performance objectives apply is E297110 as shown in Appendix 1.

PARAMETER	OBJECTIVE	METHOD/NOTES
Total Phosphorus	$\leq 20\mu\text{g/L}$	Growing season average calculated from measurements collected every two weeks between June 15 and September 30 annually.

Date issued: November 19, 2014
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(most recent)



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Mining Authorizations

4B3 **WLC AWTF MONITORING PROGRAM**

	WLC AWTF WEST LINE CREEK (Influent)	WLC AWTF LINE CREEK (Influent)	BUFFER POND OUTFALL (Effluent)
<i>EMS Number</i>	<i>E293371</i>	<i>E293370</i>	<i>E291569</i>
PARAMETER			
TSS & Turbidity (field parameters) ³	D	D	D
BOD	-	-	3X/W
Total Selenium	-	-	3X/W
Selenium Speciation ⁽ⁱ⁾	-	-	M
Field Parameters ^(a)	D	D	D
Conventional Parameters ^(b)	M	M	M
Major Ions ^(c)	M	M	M
Nutrients ^(d)	M	M	M
Nitrate (Teck Internal Lab Results)	W	W	W
Total Sulphide	-	-	M
Total and Dissolved Metals Scan ^(e)	M	M	M
Bromate	-	-	M
Hydrogen Peroxide (Teck Internal Lab Results)	-	-	M
Ozone (Teck Internal Lab Results)	-	-	M
Flow ^(f)	C	C	C
96 hour Rainbow Trout single concentration toxicity test ^(g)	-	-	Q*
48 hour <i>Daphnia magna</i> single concentration toxicity test ^(g)	-	-	Q*

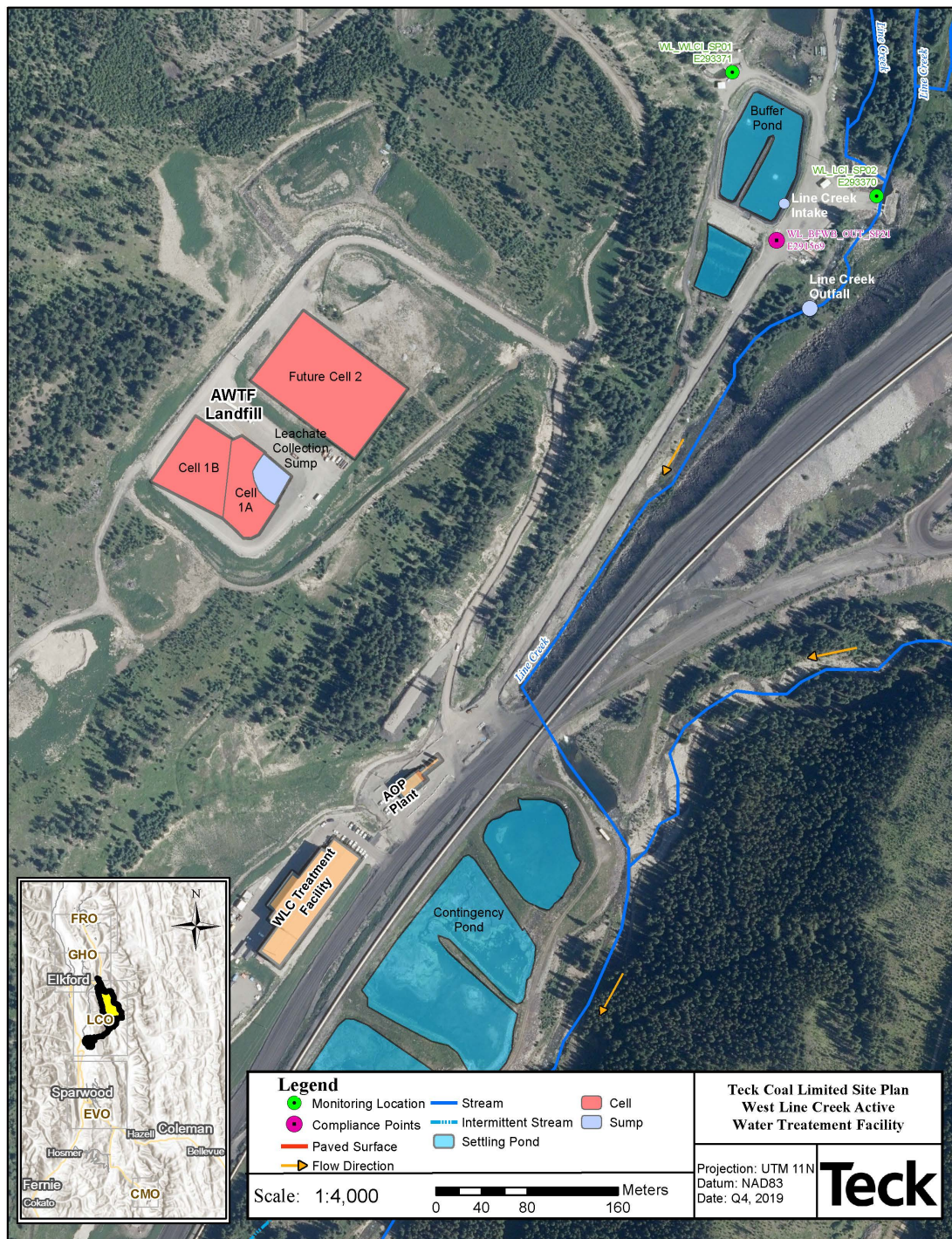
- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) TSS may be determined as per Permit 5353, Section 2.3.
- 4) Teck must notify the director within 24 hours if an LCO laboratory result for TSS is greater than 10 mg/L at the WLC AWTF Buffer Pond outlet (E291569).
- 5) Teck must notify the director immediately if a third-party laboratory result is greater than 10 mg/L TSS at the WLC AWTF Buffer Pond outlet (E291569).

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(most recent)



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Mining Authorizations

4B4 WLC AWTF SITE PLAN



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Date issued: November 19, 2014
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(most recent)

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APPENDIX 4C – ELKVIEW OPERATIONS SATURATED ROCK FILL (EVO SRF)

Additional requirements are detailed in Appendix 4A.

4C1 AUTHORIZED DISCHARGES

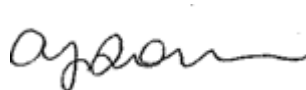
This section applies to the discharge of effluent from the Elkview Operations Saturated Rock Fill (EVO SRF) to Erickson Creek and Bodie Rock Drain. The EVO SRF influent is comprised of contact water from Erickson Creek and Natal Pit. The site reference number for this discharge is the Effluent Retention Pond Outlet (F2_BPO, E321812) as shown in Appendix 4C5.

4C1.1 The typical flow is to be used to calculate permit fees for effluent discharges. The typical flow through the EVO SRF is 20,000 cubic meters per day (i.e., 95% of the design capacity of 21,053 m³/day). The typical flow refers to the discharge rate expected during normal operations and should not be interpreted as a compliance limit or requirement.

4C1.2 The treated effluent discharged to Erickson Creek must always not be acutely toxic, as per Section 6.2. The characteristics of the discharge at the Effluent Retention Pond Outlet (F2_BPO, E321812) must be equivalent to or better than:

PARAMETER	LIMIT ^(a)
Effluent Toxicity (96 hr rainbow trout single concentration, and 48 hr <i>Daphnia magna</i> single concentration)	< 50% mortality
Antiscalant	25 mg/L, based on a two-minute time weighted average ^(b)
Ammonia	1.2 mg/L
Biochemical Oxygen Demand (BOD)	25 mg/L

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Nitrite (as N)	0.4 mg/L
Total Sulphide	0.01 mg/L
Total Phosphorus	0.10 mg/L (monthly average)
pH	Minimum: 6.5 Maximum: 9.0
Dissolved Oxygen	5.0 mg/L

(a) Compliance with the limits above must be determined by third party CALA certified laboratory results except for Antiscalant which will be determined by dosing rates and pH and DO which will be via field analysis.

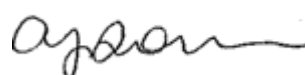
(b) According to the calculation in the Operations Plan

4C1.3 Limits for total selenium and nitrate (as N) in effluent discharged from the EVO SRF are included in the Elkview Operations compliance limit at the Elkview Operations Michel Creek Compliance Point (EV_MC2) (Section 2.6).

4C1.4 The discharge is authorized from Authorized Works which are the Erickson Creek intake, influent pipeline from Erickson Creek, influent piping from Natal Pit, reagent dosing facilities, conveyance pipelines, injection wells, monitoring wells, extraction wells, Effluent retention pond, Erickson Creek effluent pipeline, Erickson Creek outfall, Bodie Rock Drain, low point drains, high point vents, pressure safety valves, rupture discs and related appurtenances approximately located as shown on the Site Plan in Appendix 4C5.

4C1.5 The location of the facilities from which the discharge originates and the location of the points of discharge are Lot 1, District Lot 4588 4589 Kootenay District, Plan 7590 9330, except parts included in Plans 9591 9262 10218 10797 11205 12980 14030 14643 15615 15081 17773 18084 18351 12403 NEP59847 NEP22563 NEP60990 NEP61045 NEP61240 NEP61298 NEP62835 NEP66365 NEP68373 NEP73532 NEP89674 PID: 010-681-043.

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(most recent)



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Mining Authorizations

4C2 SITE PERFORMANCE OBJECTIVES

4C2.1 Water Temperature

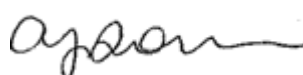
Water temperature measured at Erickson Creek at mouth (EV_EC1) must be managed to not exceed the upper temperature thresholds based on the following Site Performance Objectives.

The site reference number where the Site Performance Objectives apply is EV_EC1 (0200097) as shown in Appendix 4C5.

PARAMETER		OBJECTIVE (<i>maximum daily temperature</i>)
Temperature	January 1 to April 30 and November 1 to December 31	<7°C
	May 1 to August 31	<13°C
	September 1 to October 31	<10°C

Based on the results of the LAEMP, the director may adjust these Site Performance Objectives, and the permittee may be required to implement mitigation measures if needed to achieve the updated Site Performance Objectives.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



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Mining Authorizations

4C3 OPERATIONAL REQUIREMENTS

4C3.1 SRF Operational Contingency Plan

The permittee must develop and implement an operational contingency plan (alarm strategy) to manage the parameters listed in Section 4C1.2 related to operation of the EVO SRF that pose a risk of impacts to receptors in the receiving environment. The plan must be submitted to the director 30 days prior to the end of the commissioning period for the EVO SRF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes to the plan. The plan must include an operational monitoring program and thresholds that trigger management actions that will be implemented to mitigate the risk of impacts.

If the onsite laboratory sample results are in exceedance of the limits specified in Section 4C1.2, the permittee must immediately collect samples for analysis at a CALA certified laboratory. These results must be included in the routine reports per Section 4A of Appendix 4.

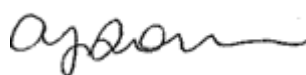
4C3.2 EVO SRF Performance Metrics

The permittee must develop and track key metrics demonstrating the performance of the EVO SRF, including but not limited to removal of nitrate and selenium load. The performance metrics to be tracked must be submitted to the director 30 days prior to the end of the commissioning period for the EVO SRF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes to the metrics. The performance metrics must align with the EVWQP goals and environmental management objectives. The permittee must present the performance metrics results at routine regulator updates and in routine reports per Section 4A of Appendix 4.

4C3.3 Erickson Creek Discharge Management Plan

The permittee must develop and implement a discharge management plan to manage discharge from the EVO SRF to Erickson Creek. The plan must be submitted to the director 30 days prior to the end of the commissioning period for the EVO SRF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

to the plan. The plan must describe the actions and monitoring Teck will implement to minimize change in streamflow between upstream and downstream of the Erickson Creek intake/outfall structure and follow the Federal Department of Fisheries and Oceans Canada (DFO) guidance on allowable rates of change in streamflow to avoid adverse effects to fish habitat. The permittee must report the monitoring results from the plan in the routine reports per Section 4A of Appendix 4.

4C3.4 Adaptive Management Plan Studies

The permittee must develop and implement the following studies under the Adaptive Management Plan (AMP) to resolve uncertainties regarding the water balance in Erickson Creek and potential unidentified mine contact water discharge pathways. The study designs must incorporate feedback from the Elk Valley Groundwater Working Group and be submitted to the director for approval by March 31, 2021.

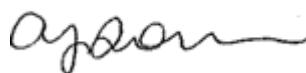
- i. Uncertainty: Erickson Creek water balance study. The study must resolve uncertainty related to the magnitude of total precipitation, evapotranspiration, surface flow and groundwater flow in the watershed. In completing the study, the permittee must demonstrate closure of the Erickson Creek water balance to the satisfaction of the director.
- ii. Uncertainty: Michel Creek contaminant load balance study. The study must resolve uncertainty related to the potential existence of an unaccounted mine contact water discharge pathway from EVO to Michel Creek. The study must utilize measured water quality data from mine contact surface water and groundwater sources. If the mass balance for contaminant loadings cannot be adequately closed to the satisfaction of the director, then Teck must develop and implement an additional study to locate and characterize the missing contaminant load pathway(s).

Progress updates and study findings must be reported in the annual AMP report per Section 10.

4C3.5 EVO SRF Maintenance of Works, Emergency Procedures and Bypasses

This section refers only to authorized discharges and Authorized Works defined in Section 4C1 and is applicable during the operational phase of this facility.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
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Mining Authorizations

The permittee must regularly inspect the Authorized Works and maintain them in good working order, in accordance with the Operations Plan.

The permittee must maintain a record of inspections and maintenance of the Authorized Works and make the record available to an officer upon request.

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges.

The permittee must not allow any discharge of influent or effluent authorized in Section 4C1 to bypass the Authorized Works, except with the prior written approval of the director, and except as defined in the following table.

EVENT	CONSECUTIVE HOURS IN RECIRCULATION (hrs)	REPORTING	MEET ALL EXISTING REQUIREMENTS OF PERMIT	ENHANCED MONITORING	IMMEDIATE NOTIFICATION TO DIRECTOR
Planned maintenance, unplanned maintenance and other downtime when influent bypasses the SRF	<24	X	X	-	-
	≥24	X	X	X	X
Discharge from influent or effluent pipelines to maintain design pressure, prevent freezing or prevent water quality changes	n/a	-	X	-	-

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)

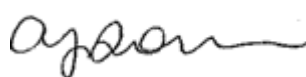


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For the purpose of this condition the following definitions apply.

- i. Immediate notification to director: notify the director of the emergency or other condition via the ENVSECoal@gov.bc.ca email address, or as otherwise instructed by the director.
- ii. Meet all existing permit requirements: continue to meet the requirements of this authorization, including, but not limited to, meeting Section 2 compliance limits at all Compliance Points.
- iii. Reporting: submit written documentation of the emergency or other condition and the remedial action that has and will be taken, a schedule of implementation of actions and the date the findings as to the cause of the incident will be reported to the director and KNC. This information must be submitted with the next quarterly treatment performance report required in Section 4A9 unless otherwise required by the director.
- iv. Normal or effective operation of the SRF: The SRF is considered to be operating effectively if it is removing the facility's portion of the selenium and nitrate load to meet the downstream monthly average limits at EV_MC2. Under normal operations, temporary recirculation (i.e., downtime) occurs both during routine maintenance and during unscheduled events such as power fluctuations or alarm level exceedances.
- v. Influent Bypass: When the SRF is put into temporary recirculation mode (i.e., full recycle) and untreated influent contact water from Erickson Creek temporarily bypasses the facility.
- vi. Enhanced monitoring: The permittee must collect daily samples at EV_EC1 (0200097) and EV_MC2 (E300091) and analyze them for total selenium and nitrate for the remainder of the bypass event.
- vii. Discharge from the influent or effluent pipelines to maintain design pressure, prevent freezing, or prevent water quality changes: Discharges from either the influent or effluent pipeline at low point drains, high point vents, pressure safety valves or rupture discs at booster stations. This means discharges associated with the intended function of the Authorized Works to control pressure and vacuum, prevent freezing, and prevent water quality changes within the pipeline (e.g., generation of H₂S). The released water must be controlled via the operation's surface water management system.

Date issued: November 19, 2014
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(most recent)




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Mining Authorizations

4C4 EVO SRF MONITORING PROGRAM

	NATAL PIT INTAKE (Influent)	ERICKSON CREEK INTAKE (Influent)	EFFLUENT RETENTION POND OUTLET (Effluent)	ERICKSON CREEK OUTFALL (Effluent)	BODIE ROCK DRAIN (Effluent)	ERICKSON CREEK IMMEDIATELY DOWNSTREAM OF OUTFALL	ERICKSON CREEK AT MOUTH (3)	EVO MICHEL CREEK COMPLIANCE POINT (3)	MICHEL CREEK UPSTREAM OF BODIE AND GATE CREEK	MICHEL CREEK UPSTREAM OF ERICKSON CREEK (3)	GATE CREEK DISCHARGE MONITORING LOCATION (3)	BODIE CREEK DISCHARGE MONITORING LOCATION (3)	ELK RIVER DOWNSTREAM OF MICHEL CREEK
<i>EMS Number</i>	<i>E321791</i>	<i>E321811</i>	<i>E321812</i>	<i>E321813</i>	<i>E321815</i>	<i>E321814</i>	<i>0200097</i>	<i>E300091</i>	<i>310168</i>	<i>0200203</i>	<i>E206231</i>	<i>E102685</i>	<i>200393</i>
<i>Teck Station ID</i>	<i>F2 NWPI</i>	<i>F2 ECIN</i>	<i>F2 BPO</i>	<i>F2 ECF</i>	<i>F2 BRDF</i>	<i>EV ECOUT</i>	<i>EV EC1</i>	<i>EV MC2</i>	<i>EV MC2a</i>	<i>EV MC3</i>	<i>EV GT1</i>	<i>EV BC1</i>	<i>EV ER1</i>
PARAMETER													
Field parameters ^(a)	D	D	D	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Conventional Parameters ^(b)	W	W	W	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Major Ions ^(c)	W	W	W	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Nutrients ^(d)	W	W	W	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Total Sulphide	W	W	W	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Dissolved Metals Scan ^(e)	W	W	W	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Total Metals Scan ^(e)	M	M	M	-	-	M	M	M/W	M	M/W	M	M	M/W
Total Selenium	-	-	3X/W	-	-	-	-	-	-	-	-	-	-
Flow	C	C	C	C	C	C	C	C	-	-	C	C	-
Temperature	C	C	-	C	-	-	C	-	-	-	-	-	-
96 hour Rainbow Trout single concentration toxicity test ^(g)	-	-	Q	-	-	Q	Q	-	-	-	Q	Q	-
48 hour Daphnia magna single concentration toxicity ^(g)	-	-	Q	-	-	Q	Q	-	-	-	Q	Q	-
Selenium Speciation(i)	W	W	W	-	-	-	-	M	M	M	-	-	-
Calcite Precipitation Propensity Monitoring	-	-	M	-	-	M	-	-	-	-	M	M	-
Rock Mass Monitoring (4)													

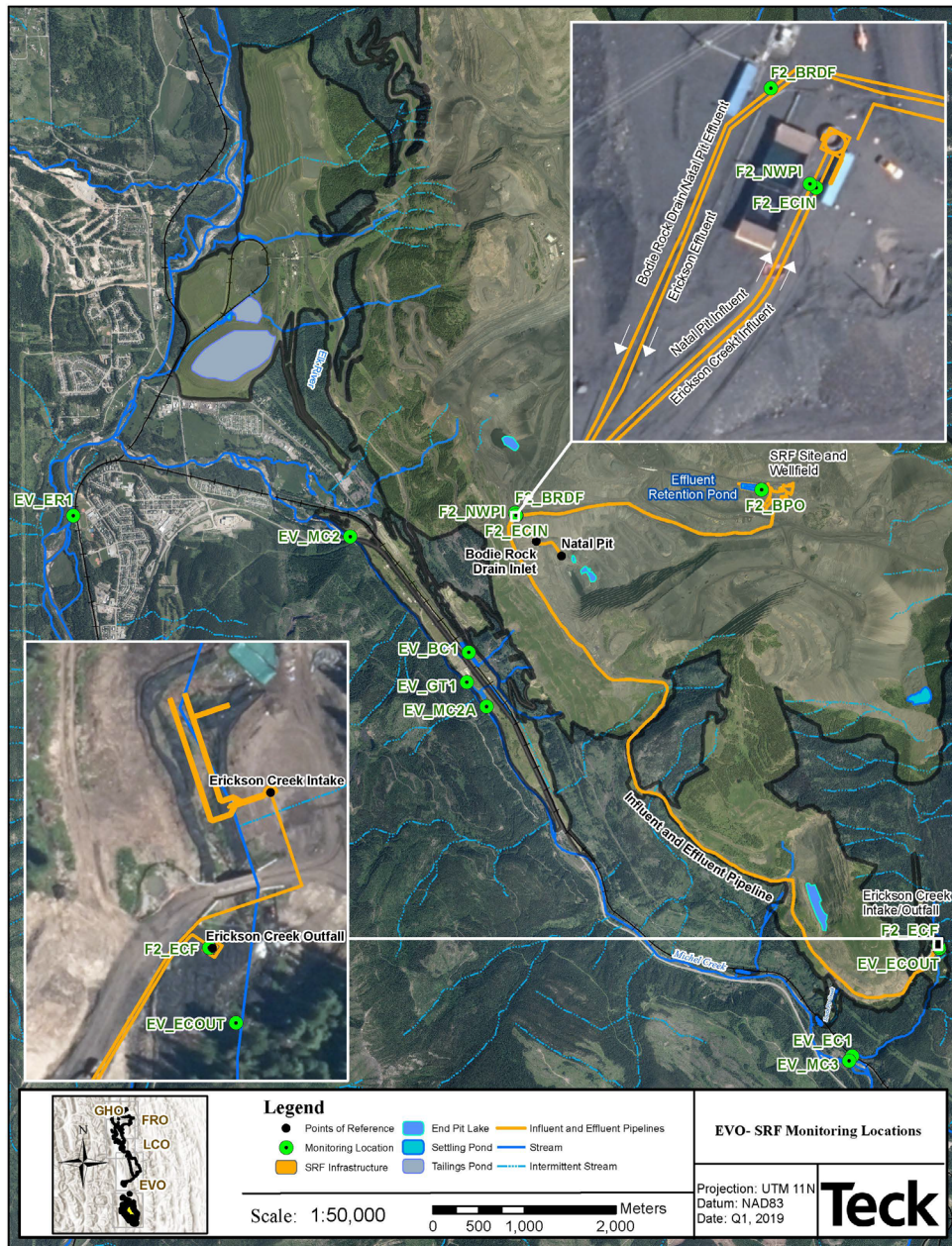
- 1) Refer to Table 26, Appendix 3, for abbreviation descriptions
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Monitoring location appears in two monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in both Section 9 and Appendix 4.
- 4) Rock mass monitoring to be conducted 1X/6W on an as-needed basis as a confirmatory measure of the more frequent calcite monitoring methods. Locations to be determined, both upstream and downstream of EV_ECOUT.

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(most recent)



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4C5 **EVO SRF SITE PLAN**



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(most recent)

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Mining Authorizations

APPENDIX 4D – Fording River Operations – South AWTF (FRO-S AWTF)

Additional requirements are detailed in Appendix 4A.

4D1 AUTHORIZED DISCHARGES

This section applies to the discharge of effluent from the Fording River Operations – South Active Water Treatment Facility (FRO-S AWTF) to the Fording River and Kilmarnock Creek. The FRO-S AWTF influent is comprised of contact water from waste rock piles in the Kilmarnock Creek, Cataract Creek, and Swift Creek catchments, non-hazardous leachate from the WLC AWTF residual waste landfill, and other sources as approved by the director in writing. The site reference number for this discharge is E321351 (FS_BPO) as shown in Appendix 4D4.

4D1.1 The typical flow is to be used to calculate permit fees for effluent discharges. The typical flow through the FRO-S AWTF is 20,000 cubic meters per day (i.e., 95% of the design capacity of 21,053 m³/day). The typical flow refers to the discharge rate expected during normal operations and should not be interpreted as a compliance limit or requirement.

4D1.2 The treated effluent discharged to the Fording River and Kilmarnock Creek must always not be acutely toxic, as per Section 6.2. The characteristics of the discharge at the Effluent Retention Pond outlet (FS_BPO, E321351) must be equivalent to or better than:


PARAMETER	LIMIT ^(a)
Effluent Toxicity (96 hr rainbow trout single concentration, and 48 hr <i>Daphnia magna</i> single concentration)	≤ 50% mortality
Antiscalant	25 mg/L, two-minute time weighted average ^(b)

(a) Compliance with the limits above must be determined by third party CALA certified laboratory results except for Antiscalant which will be determined by dosing rates.

(b) According to the calculation in the Operations Plan

4D1.3 Limits for total selenium and nitrate (as N) in effluent discharged from the FRO-S AWTF are included in the Fording River Operations compliance limit at the Fording River Operations Compliance Point (Section 2.1).

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A.J. Downie, M.Sc., P.Ag.
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Mining Authorizations

4D1.4 The permittee must manage FRO-S AWTF effluent temperature to be equivalent to or below the following monthly average limits at the Fording River Outfall (FS_EFF-SC; E323231).

PARAMETER	LIMIT (<i>monthly average</i>)	
Temperature	January 1 to February 28	6°C
	March 1 to April 30*	6°C
	May 1 to September 30	13°C
	October 1 to October 31*	10°C
	November 1 to November 30*	6°C
	December 1 to December 31	6°C

*Effective date – September 1, 2022

4D1.5 The permittee must manage the parameters listed in the table below in accordance with the operational contingency plan required in Section 4D2.1. Treated effluent during normal operations was predicted in the FRO-S AWTF operations application to have characteristics as presented in the following table. These maximum concentrations should not be interpreted as compliance limits; however, are to be used to calculate permit fees for effluent discharges:

PARAMETER	MAXIMUM PREDICTED CONCENTRATION ^(a)
Sulphide	0.05 mg/L
Nitrite	0.2 mg/L
Ammonia	1 mg/L
Dissolved Oxygen	8 mg/L (min)
pH	6.5 – 8.5
Hydrogen Peroxide	0.1 mg/L
Ozone	20 µg/L
Biological Oxygen Demand	45 mg/L
Total Phosphorus	0.1 mg/L
Chloride	150 mg/L
Total Suspended Solids	5 mg/L

(a) from FRO-S AWTF operations application Table 5.3-3

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(most recent)



A.J. Downie, M.Sc., P.Ag.
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Mining Authorizations

4D1.6 The discharge is authorized from Authorized Works which are the Swift Creek Intake, Kilmarnock Creek Intake, influent and effluent conveyance pipelines, Effluent Retention Structure, Active Water Treatment Plant, Fording River Outfall, Kilmarnock Creek Outfall, low point drains, high point vents, pressure safety valves, rupture discs and related appurtenances approximately located as shown on the Site Plan in Appendix 4D4.

4D1.7 The location of the facilities from which the discharge originates and the location of the point of discharge is District Lot 6637, District Lot 6047, District Lot 6688, Kootenay Land District.

4D2 OPERATIONAL REQUIREMENTS

4D2.1 AWTF Operational Contingency Plan

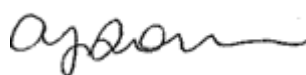
The permittee must develop and implement an operational contingency plan to manage the parameters listed in Section 4D1.5 related to operation of the AWTF that pose a risk of impacts to receptors in the receiving environment. The plan must be submitted to the director 30 days prior to the end of the commissioning period for the FRO-S AWTF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes to the plan. The plan must include an operational monitoring program and thresholds that trigger management actions that will be implemented to mitigate the risk of impacts.

4D2.2 FRO-S AWTF Performance Metrics

The permittee must develop and track key metrics demonstrating the performance of the AWTF, including but not limited to removal of nitrate and selenium load, and implementation of alarm strategy level 3 responses. The performance metrics must align with the EVWQP goals and environmental management objectives.

- i. The performance metrics to be tracked must be submitted to the director 30 days prior to the end of the commissioning period for the FRO-S AWTF.
- ii. The permittee must notify the director at least 15 days prior to implementing any proposed changes to the metrics.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

- iii. The permittee must present the performance metrics results at routine regulator updates and in routine reports per Section 4A of Appendix 4.
- iv. The permittee must include a performance metric to assess performance of the temperature management system in managing temperature downstream of the Fording River Outfall (at FR_SCOUTDS) to within +/- 1 degree Celcius of background (at FR_FR3). The performance metric must consider the influence of the Swift Creek Sediment Pond discharge and available chiller capacity.
- v. The permittee must complete an engineering review of the temperature management system to determine necessary operational changes and process modifications needed to meet the permit limits for temperature in Section 4D1.4, and submit the report to the director by July 31, 2021.

4D2.3 FRO-S AWTF Maintenance of Works, Emergency Procedures and Bypasses

This section refers only to authorized discharges and Authorized Works defined in Section 4D1 and is applicable during the operational phase of this facility.

The permittee must regularly inspect the Authorized Works and maintain them in good working order, in accordance with the Operations Plan.

The permittee must maintain a record of inspections and maintenance of the Authorized Works and make the record available to an officer upon request.

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges.

The permittee must not allow any discharge of influent or effluent authorized in Section 4D1 to bypass the Authorized Works, except with

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

the prior written approval of the director, and except as defined in the following table.

EVENT	CONSECUTIVE HOURS IN RECIRCULATION (hrs)	REPORTING	MEET ALL EXISTING REQUIREMENTS OF PERMIT	ENHANCED MONITORING	IMMEDIATE NOTIFICATION TO DIRECTOR
Planned maintenance, unplanned maintenance and other downtime when influent bypasses the AWTF	<24	X	X	-	-
	≥24	X	X	X	X
	(a)				
Discharge from influent or effluent pipelines to maintain design pressure, prevent freezing or prevent water quality changes	n/a	-	X	-	-

(a) The permittee must not exceed a total of 144 hours in recirculation per month (i.e., rolling 30-day cumulative total)

For the purpose of this condition the following definitions apply.

- i. Immediate notification to director: notify the director of the emergency or other condition via the ENVSECoal@gov.bc.ca email address, or as otherwise instructed by the director;
- ii. Meet all existing permit requirements: continue to meet the requirements of this authorization, including, but not limited to, meeting Section 2 compliance limits at all Compliance Points;
- iii. Reporting: submit written documentation of the emergency or other condition and the remedial action that has and will be taken, a schedule of implementation of actions and the date the findings as to the cause of the incident will be reported to the director and KNC. This information must be submitted with the next quarterly

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)

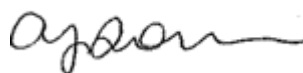


A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

treatment performance report required in Section 4A9 unless otherwise required by the director.

- iv. Normal or effective operation of the AWTF: The AWTF is considered to be operating effectively if it is removing the facility's portion of the selenium and nitrate load to meet the downstream monthly average limits at FR_FRABCH. Under normal operations, temporary recirculation (i.e., downtime) occurs both during routine maintenance and during unscheduled events such as power fluctuations or alarm level exceedances.
- v. Influent Bypass: When the AWTF is put into a temporary recirculation mode and untreated influent water temporarily bypasses the facility. This occurs with full closure of the intakes.
- vi. Enhanced monitoring: The permittee must collect daily samples at FR_FRABCH (E223753) and FR_SCOUTDS (E320695) and analyze them for total selenium and nitrate for the remainder of the bypass event.
- vii. Discharge from the influent or effluent pipelines to maintain design pressure, prevent freezing, or prevent water quality changes: Discharges from either the influent or effluent pipeline at low point drains, high point vents, pressure safety valves or rupture discs at booster stations. This means discharges associated with the intended function of the Authorized Works to control pressure and vacuum, prevent freezing, and prevent water quality changes within the pipeline (e.g., generation of H₂S). The released water must be controlled via the operation's surface water management system.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

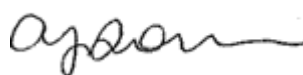
4D2.4 Adaptive Management Plan Studies

The permittee must develop and implement the following studies under the Adaptive Management Plan (AMP) to resolve uncertainties regarding operation of the Kilmarnock Clean Water Diversion and the need for additional flow and groundwater information to support water quality management in FRO-S. The study designs must be submitted to the director and KNC by April 30, 2021. The permittee must provide quarterly updates to ENV and KNC on implementation of the workplans. This enhanced engagement will end when written notice is provided by the director.

- i. Uncertainty: Kilmarnock Clean Water Diversion study. The study must resolve uncertainty related to how operation of the Kilmarnock Clean Water Diversion influences the magnitude of mine contact water entering groundwater.
- ii. Uncertainty: Kilmarnock Creek Intake groundwater load bypass study. The study must resolve the uncertainty related to the magnitude and seasonal fluctuation of groundwater load bypassing the FRO-S AWTF Kilmarnock Creek Intake.
- iii. Uncertainty: Fording River valley groundwater study. The study must resolve the uncertainty related to the parameter of concern groundwater plume and load in the Fording River valley between well FR_GH_WELL4 and FR_FRABCH.
- iv. Uncertainty: Swift Creek Sediment Ponds seepage study. The study must resolve the uncertainty related to the magnitude of seepage from the Swift Creek Sediment Ponds and the resulting parameter of concern groundwater plume and load towards the Fording River valley aquifer.

Progress updates and study findings must be reported in the annual AMP report per Section 10.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

4D2.5 Upper Fording River Chronic Toxicity Study

The permittee must submit a study design for an Upper Fording River Chronic Toxicity Study to the director by January 31, 2021, for approval. The study design must be reviewed by the EMC and be designed as a study to evaluate the cause, extent, and magnitude of chronic effects in the upper Fording River. The permittee must provide a summary of EMC advice and how it was considered in the study design. Monitoring results and interpretation must be compiled into a written report and submitted to the director by April 15, 2022. The final report must be to the satisfaction of the director.

4D2.6 Fording River Compliance Point Monitoring Frequency

The permittee must undertake a study to assess the accuracy of monthly average surface water nitrate, selenium and sulphate concentration calculations at FR_FRABCH with the below listed sampling frequencies. Accuracy must be estimated for each parameter for each calendar month for each sampling program. A report on findings must be submitted to the director by May 31, 2022.

- i. Weekly sampling March 15 through July 15 and monthly sampling August through February.
- ii. Weekly sampling March 15 through July 15 and twice-monthly sampling in August through February.
- iii. Weekly sampling year-round.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

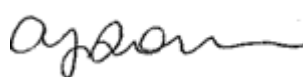
4D2.7 FRO-S AWTF Recirculation Event Mass Loading Travel Time Assessment

The permittee must undertake an assessment to determine the appropriate timing for water quality sample collection at FR_FRABCH that is representative of the conditions during FRO-S AWTF recirculation. The FRO Compliance Point is approximately 11.8 km downstream of the Fording River Outfall and the full realization of recirculation on surface water quality is not expected to be instantaneous. The assessment must incorporate both seasonal and temporal aspects to inform the appropriate timing of water quality sample collection during recirculation. A summary report must be submitted to the director by April 30, 2023.

4D2.8 Fording River Outfall Fish Plan

- i. The permittee must develop a plan to manage potential residual risks to fish resulting from effluent discharged from the Fording River Outfall. The permittee must prepare the plan in consultation with the Elk Valley Fish and Fish Habitat Committee and/or the Westslope Cutthroat Trout Recovery Working Group and include a summary of advice and how it was incorporated in the plan. The plan must include a trigger response plan and mitigations, or reference previously developed guidance, that can be implemented to prevent fish stranding and reduce the risks of isolation and fish mortality. The scope and scale of the plan is limited to areas of the Fording River that could be directly affected by the FRO-S AWTF operations. The plan must be submitted to the director by 7 days prior to forward flow commissioning of the FRO-S AWTF. The submitted Fording River Outfall Fish Plan must be implemented and any updates to the plan must be submitted to the director within 30 days of adoption. The permittee must submit an annual summary of trigger exceedances and actions taken to the director by June 30th of each year.
- ii. The permittee must complete an assessment of modifications required to meet a potential site performance objective for temperature of +/- 1 degree Celcius of background downstream of the Fording River Outfall, or other temperature requirements developed to support the Westslope Cutthroat Trout Recovery Plan. The assessment must be submitted to the director by June 30, 2023.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)




A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

4D3 FRO-S AWTF MONITORING PROGRAM

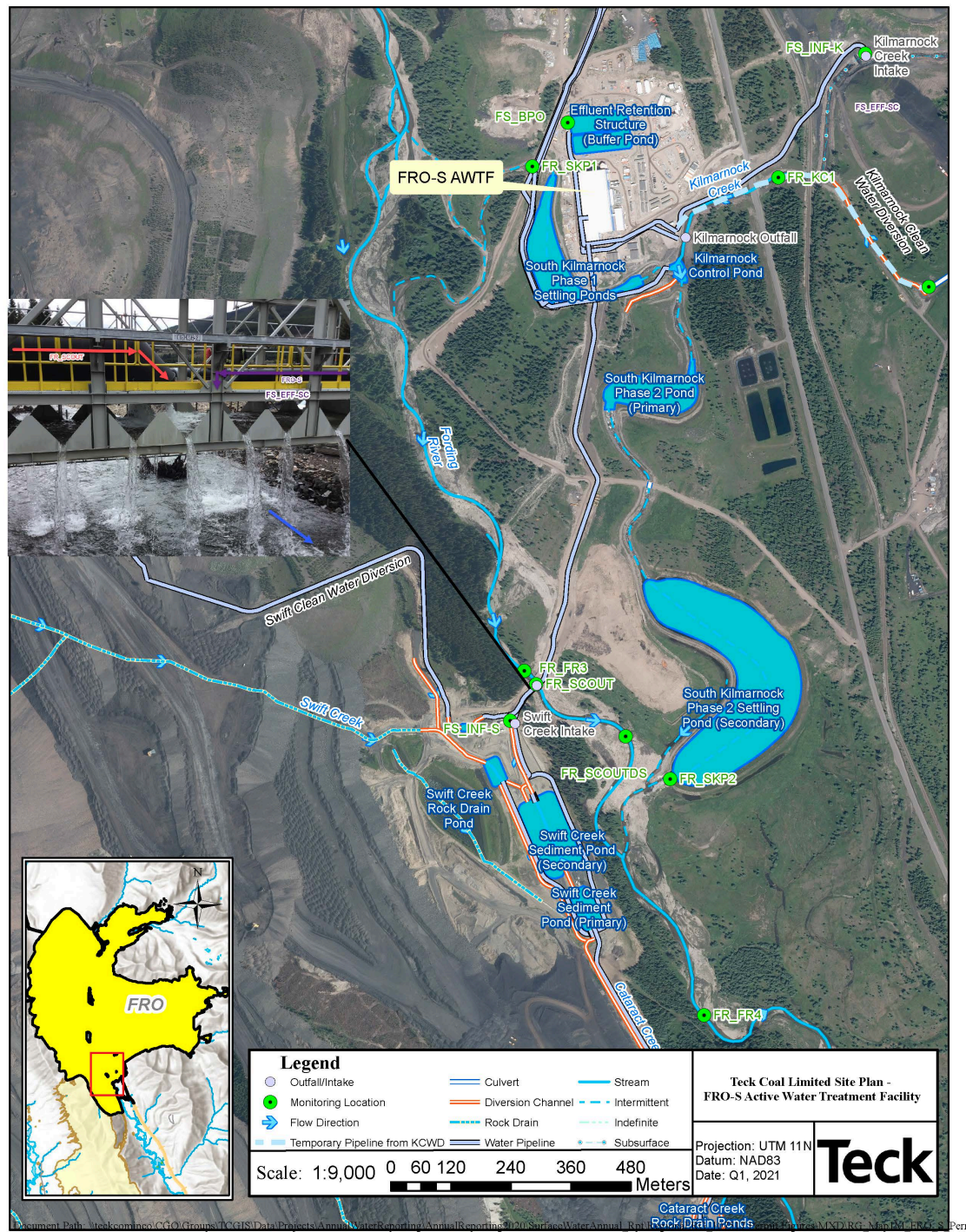
	KILMARNOCK CREEK FRO-S AWTF INFLUENT (Influent)	SWIFT-CATARACT CREEKS FRO-S AWTF INFLUENT (Influent)	FRO-S AWTF EFFLUENT RETENTION POND OUTLET (Effluent)	FRO-S AWTF OUTFALL STRUCTURE	FORDING RIVER UPSTREAM OF FRO-S AWTF OUTFALL STRUCTURE (5)	FORDING RIVER ~100 M DOWNSTREAM OF FRO-S AWTF OUTFALL STRUCTURE (5)	FORDING RIVER OPERATIONS COMPLIANCE POINT
EMS Number	E321412	E321411	E321351	E323231	E320693	E320695	E223753
Teck Station ID	FS INF-K	FS INF-S	FS BPO	FS EFF-SC	FR FR3	FR SCOUTDS	FR FRABCH
PARAMETER							
TSS & Turbidity (field parameters) (3)	D	D	D	-	-	-	-
BOD	-	-	3X/W	-	-	W/M	-
Total Selenium	-	-	3X/W	-	-	-	-
Selenium Speciation (i)	-	-	M	-	-	M	-
Field Parameters (a)	D	D	D	-	-	W/M	W/M
Conventional Parameters (b)	M	M	M	-	-	W/M	W/M
Major Ions (c)	M	M	M	-	-	W/M	W/M
Nutrients (d)	M	M	M	-	-	W/M	W/M
Nitrate (Teck Internal Lab Results)	3X/W	3X/W	3X/W	-	-	-	W/M
Total Sulphide	-	-	M	-	-	W/M	-
Total and Dissolved Metals Scan (e)	M	M	M	-	-	W/M	W/M
Bromate	-	-	M	-	-	M	-
Hydrogen Peroxide (Teck Internal Lab Results)	-	-	M	-	-	M	-
Ozone (Teck Internal Lab Results)	-	-	M	-	-	-	-
Flow	C	C	C	-	-	-	-
Temperature	-	-	-	C	C	C	-
96 hour Rainbow Trout single concentration toxicity test (g)	-	-	Q*	-	-	-	-
48 hour Daphnia magna single concentration toxicity test (g)	-	-	Q*	-	-	-	-
Calcite Precipitation Propensity -Monitoring	-	-	-	-	1X/2W	1X/2W	-
Rock Mass Monitoring (4)	-	-	-	-	1X/6W, as needed	1X/6W, as needed	-

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) TSS may be determined as per Permit 424, Section 2.3.
- 4) Rock mass monitoring to be conducted on an as-needed basis as a confirmatory measure of the more frequent calcite monitoring methods.
- 5) Monitoring location appears in multiple monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in Section 9 and Appendices 4 and 5.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)


A.J. Downie, M.Sc., P.Ag.
for Director, Environmental Management Act
Mining Authorizations

4D4 FRO-S AWTF SITE



Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)

A.J. Downie

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Mining Authorizations

APPENDIX 5: CALCITE TREATMENT FACILITIES

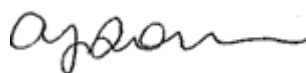
APPENDIX 5A – Calcite Treatment Facility General Operational Requirements

APPENDIX 5B – Lower Greenhills Creek Antiscalant Addition System

APPENDIX 5C – Swift-Cataract Antiscalant Addition System

APPENDIX 5D – Line Creek Operations (LCO) Dry Creek Antiscalant Addition System

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDIX 5A – Calcite Treatment Facility General Operational Requirements

This section includes requirements that apply to all calcite treatment facilities. Subsequent sections include facility-specific requirements.

5A1 COMMISSIONING PLAN

A Commissioning Plan for calcite treatment facilities must be prepared by a Qualified Professional, submitted to the director and implemented prior to commencement of discharge from the calcite treatment facility. The Commissioning Plan may include all facilities, though discussion for each facility must be distinct. Alternatively, the permittee may submit a Commissioning Plan for each facility. The Commissioning Plan must include but is not necessarily limited to operational procedures required to commission the calcite treatment facilities, including any additional monitoring and reporting required to demonstrate that no adverse environmental impacts result from commissioning.

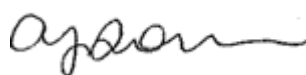
5A2 OPERATIONS PLAN

An Operations Plan for calcite treatment facilities must be prepared by a Qualified Professional, submitted to the director and implemented prior to commencement of the discharge from the calcite treatment facilities. The Operations Plan may include all facilities, though discussion for each facility must be distinct. Alternatively, the permittee may submit an Operations Plan for each facility. The Operations Plan must include all stand-alone calcite treatment systems. Calcite treatment associated with any treatment facility (e.g., WLC AWTF) must be captured in the Operations Plan for that treatment facility.

The Operations Plan must include but is not necessarily limited to:

- i. The facility operator's manual, with provision for its continual improvement;
- ii. An overview of the planned maintenance program which includes an inventory of facility components and authorized replacement parts, and a detailed description of inspection, repair and replacement frequency for facility components;
- iii. Information on reagent usage and storage;

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

- iv. Documentation to verify that the facility is operated at all times within specifications and in a manner to ensure compliance with this authorization and other applicable legislation;
- v. Actions to be taken if effluent quality fails to meet the requirements of the permit;
- vi. Contingency planning which describes built-in redundancy of the facility and outlines measures to prevent emergency conditions from occurring.

Any significant update to the plan must be submitted to the director within 30 days of adoption. Minor updates must be summarized in the annual report for the time period when the minor update was made.

**5A3 CALCITE TREATMENT FACILITY MAINTENANCE OF WORKS,
EMERGENCY PROCEDURES AND BYPASSES**

This section refers only to authorized discharges and Authorized Works defined within Appendix 5.

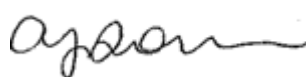
The permittee must regularly inspect the Authorized Works and maintain them in good working order, in accordance with the Operations Plan.

The permittee must maintain a record of inspections and maintenance of the Authorized Works and make the record available to an officer upon request.

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must:

- i. take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges; and
- ii. submit written documentation of the emergency or other condition and the remedial action that has and will be taken, a schedule of implementation of actions and the date the findings as to the cause of the incident will be reported to the director and KNC. This information must be submitted with the next annual performance report required in Section 5A9 unless otherwise required by the director.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

The permittee must not allow any discharge of influent or effluent authorized in Appendix 5 to bypass the Authorized Works, except with the prior written approval of the director, and except as defined in Sections 5B1.6, 5C1.5, and 5D1.5.

Normal or effective operation of Calcite Treatment Facilities is defined as follows: Calcite Treatment Facilities are considered to be operating effectively if they are achieving the prevention of calcite formation in the downstream receiving environment that the facility is intended to manage. According to the Commissioning and Operations Plans, under normal operation, temporary downtime may occur during commissioning, trouble shooting, maintenance, unsuitable in-stream flows, power fluctuations or facility alarm exceedances.

5A4 **PROCESS MODIFICATIONS**

The permittee must notify the director in writing, prior to implementing changes to any process that may adversely affect the quality and/or quantity of the discharge from the calcite treatment facilities. Notwithstanding notification under this Section, permitted levels must not be exceeded.

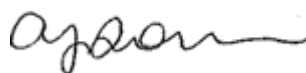
5A5 **NEW WORKS**

The director may require upgrading of the calcite treatment works based on monitoring results, and/or any other pertinent information. Plans and specifications for new pollution treatment works and upgrades to existing works must be submitted to the director as an amendment application. All new works must be approved before a discharge from the works commences.

5A6 **SITE SPECIFIC ENVIRONMENTAL EMERGENCY RESPONSE PLAN**

A Site-Specific Environmental Emergency Response Plan must be prepared for all stand-alone calcite treatment systems. The plan must be submitted to the director prior to commencement of the discharge from the calcite treatment facilities. Calcite treatment associated with any treatment facility (e.g., WLC AWTF) must be captured in the Emergency Response Plan for that treatment facility.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

The plan must include, but is not limited to:

- i. A description of measures to mitigate any health or environmental impacts, if emergencies occur;
- ii. Specific reference to the Spill Reporting Regulation; and
- iii. Instructions for staff in the event of an emergency, including contact information for local authorities (fire, police, public health), Emergency Management BC, and the director.

Any significant update to the plan must be submitted to the director within 30 days of adoption. Minor updates must be summarized in the annual report for the time period when the minor update was made.

5A7 **MONITORING**

The permittee must conduct monitoring associated with the calcite treatment facilities as defined in subsequent sections in Appendix 5. The discharge and receiving environment water sampling sites are located approximately as shown in subsequent sections in Appendix 5.

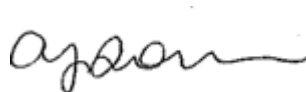
5A8 **COMMISSIONING REPORT**

A commissioning report must be submitted to the director within 60 days of completing commissioning of any new calcite treatment facility. If the commissioning report deadline corresponds with the annual report deadline, one report may be submitted to meet both requirements.

The commissioning report must include, but is not limited to:

- i. operating times;
- ii. influent flow rates or treated water volume;
- iii. antiscalant dosing rates;
- iv. calculated in-pipe antiscalant concentrations (where applicable); and
- v. monitoring data.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

5A9 ANNUAL PERFORMANCE REPORT

An annual performance report must be submitted to the director by March 31 for each year following the data collection calendar year. The report must include, but is not limited to:

- i. operating availability of the Authorized Works;
- ii. influent flow rates or treated water volume;
- iii. quantity of antiscalant used and dosing rates;
- iv. calculated in-pipe antiscalant concentrations (where applicable);
- i. a description of any incidents including process upsets, spills, issues with and bypasses of the Authorized Works;
- ii. monitoring data;
- iii. interpretation and analysis of monitoring data;
- iv. discussion of results and recommendations for changes to management and/or regulatory controls to improve protection of the environment, as appropriate; and
- v. summary of all non-compliances with the requirements of Appendix 5, submitted in an Annual Status Form.

The report must also include operational performance results of antiscalant addition systems associated with selenium and nitrate treatment facilities, including:

- i. quantity of antiscalant used and dosing rates;
- ii. rock mass monitoring and calcite precipitation propensity monitoring data;
- iii. *Daphnia magna* and rainbow trout acute toxicity results; and
- iv. Calcite Indices.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDIX 5B – Lower Greenhills Creek Antiscalant Addition System

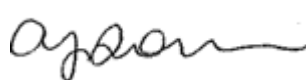
Additional requirements are detailed in Appendix 5A.

5B1 AUTHORIZED DISCHARGES

This section applies to the discharge of effluent from the Lower Greenhills Creek Antiscalant Addition System to Greenhills Creek. The Lower Greenhills Creek Antiscalant Addition System influent is Greenhills Creek sedimentation pond effluent. The site reference number for this discharge is E309912 as shown in Appendix 5B5.

- 5B1.1 Treated effluent discharged to Greenhills Creek at E309912 (GH_CAM1EFF) must always not be acutely toxic, as per Section 6.2.
- 5B1.2 Treated effluent discharged to Greenhills Creek at E309912 must not exceed an antiscalant concentration of 150 mg/L based on a 2-minute time-weighted average, according to the sampling and calculation procedure in the Operations Plan.
- 5B1.3 Antiscalant concentrations in Greenhills Creek at E309911 (GH_GH2) must not exceed 5 mg/L based on a 2-minute time-weighted average, according to the sampling and calculation procedure in the Operations Plan.
- 5B1.4 Notification of deviation from the identified antiscalant in the Teck application “Greenhills Operations Lower Greenhills Creek Calcite Management Project” dated June 15, 2017 must be provided to the director and KNC prior to implementation.
- 5B1.5 The discharge is authorized from Authorized Works which are: antiscalant addition module and related appurtenances approximately located as shown in Appendix 5B5.
- 5B1.6 The Lower Greenhills Creek Antiscalant Addition System may operate intermittently, in accordance with the Operations Plan, as required to meet the Site Performance Objectives for Calcite per Section 3.4 and prevent acute toxicity failures per Section 6.2.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

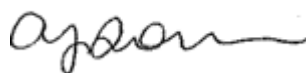
5B2 AQUATIC EFFECTS MONITORING

The permittee must implement the monitoring program as described in the approved monitoring program “Greenhills Creek Aquatic Effects Assessment and Monitoring Program”. The permittee must submit to the director any changes to the aquatic effects monitoring program prior to implementation. The director may make or request changes to the aquatic effects monitoring program at any time by specifying such in writing to the permittee.

5B3 AQUATIC EFFECTS MONITORING PROGRAM ANNUAL REPORT

The Greenhills Creek Aquatic Effects Assessment and Monitoring Program annual report must be reported on in accordance with generally accepted standards of good scientific practice in a written report and submitted to the director of each year following the data collection calendar year by June 30.

Date issued: November 19, 2014
Date amended: November 19, 2021
(most recent)



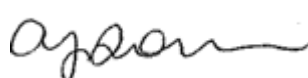
A.J. Downie, M.Sc., P.Ag.
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Mining Authorizations

**5B4 LOWER GREENHILLS CREEK ANTISCALANT ADDITION
SYSTEM MONITORING PROGRAM**

	GREENHILLS CREEK SED. POND DECANT (Influent) (5)	LOWER GREENHILLS CREEK ANTISCALANT MODULE (Effluent)	GREENHILLS CREEK D/S OF ANTISCALANT MODULE (~80 m Downstream)	GREENHILLS CREEK D/S OF SED. POND DECANT (~600 m Downstream)
<i>EMS Number</i>	<i>E102709</i>	<i>E309912</i>	<i>E321331</i>	<i>E309911</i>
<i>Teck Station ID</i>	<i>GH GH1</i>	<i>GH CAM1EFF</i>	<i>GH CA04</i>	<i>GH GH2</i>
PARAMETER				
Field Parameters (a)	M	M	-	M
Conventional Parameters (b)	M	M	-	M
Major Ions (c)	M	M	-	M
Nutrients (d)	M	M	-	M
Total and Dissolved Metals Scan (e)	M	M	-	M
96 hour Rainbow Trout single concentration toxicity test (g)	Q	Q	-	Q
48 hour <i>Daphnia</i> <i>magna</i> single concentration toxicity test (g)	Q	Q	-	Q
Flow(f)	C	-	-	-
Calcite Precipitation Propensity Monitoring	1X/2W	-	1X/2W	-
Rock Mass Monitoring	1X/6W, as needed	-	1X/6W, as needed	-

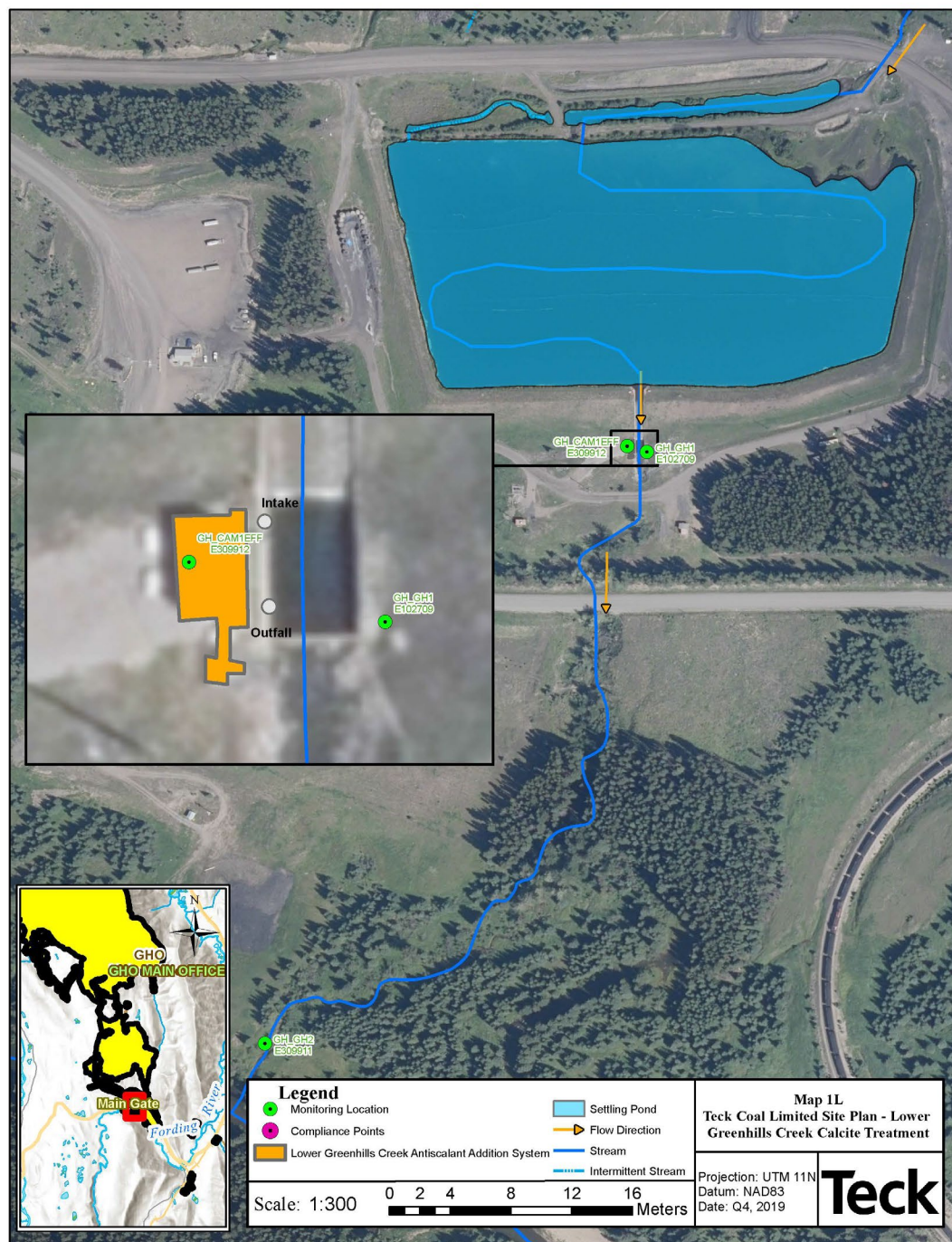
- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Calcite monitoring data are not required to be uploaded to EMS.
- 4) Refer to Section 8.5.1 and the approved annual calcite monitoring program for Calcite Index Monitoring requirements.
- 5) Monitoring location appears in two monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in both Section 9 and Appendix 5.

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5B5 **LOWER GREENHILLS CREEK ANTISCALANT ADDITION SYSTEM SITE PLAN**



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APPENDIX 5C – Swift-Cataract Antiscalant Addition System

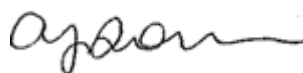
Additional requirements are detailed in Appendix 5A

5C1 AUTHORIZED DISCHARGES

This section applies to the discharge of effluent from the Swift-Cataract Antiscalant Addition System to the Fording River via the Swift Creek Intake structure, FRO AWTF-S bypass pipeline and the Fording River Outfall (i.e., saw-tooth weir on the Fording River Road crossing). The Swift-Cataract Antiscalant Addition System influent is Swift Creek Sediment Ponds effluent comprised of combined flow of Swift Creek and Cataract Creek. The site reference number for this discharge is E320694 (FR_SCOUT) as shown in Appendix 5C3.

- 5C1.1 Treated effluent discharged at E320694 must always not be acutely toxic, as per Section 6.2.
- 5C1.2 Treated effluent at E320694 must not exceed an antiscalant concentration of 25 mg/L based on a two-minute time-weighted average, according to the sampling and calculation procedure in the Operations Plan.
- 5C1.3 Notification of deviation from the identified antiscalant in the Teck application “Swift Cataract Antiscalant Addition Project” dated August 30, 2019 must be provided to the director and KNC prior to implementation.
- 5C1.4 The discharge is authorized from Authorized Works which are: antiscalant addition module and related appurtenances approximately located as shown in Appendix 5C3.
- 5C1.5 The Swift-Cataract Antiscalant Addition System may operate intermittently, in accordance with the Operations Plan, as required to meet the Site Performance Objectives for Calcite per Section 3.4 and prevent acute toxicity failures per Section 6.2.

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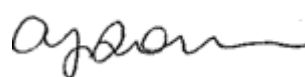
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**5C2 SWIFT-CATARACT ANTISCALANT ADDITION SYSTEM
MONITORING PROGRAM**

	SWIFT-CATARACT SED. POND DOSED WITH ANTISCALANT TO FORDING RIVER (3;4) (Effluent)	FORDING RIVER U/S OF FRO AWTF- S OUTFALL STRUCTURE (Upstream in receiving environment)	FORDING RIVER D/S OF FRO AWTF- S OUTFALL STRUCTURE (Downstream in receiving environment) (4)	SWIFT CREEK SEDIMENT PONDS TO FORDING RIVER
<i>EMS Number</i>	<i>E320694</i>	<i>E320693</i>	<i>E320695</i>	<i>E319331</i>
<i>Teck Station ID</i>	<i>FR_SCOUT</i>	<i>FR_FR3</i>	<i>FR_SCOUTDS</i>	<i>FR_SCCAT</i>
PARAMETER				
Field Parameters (a)	M	-	M	-
Conventional Parameters (b)	M	-	M	-
Major Ions (c)	M	-	M	-
Nutrients (d)	M	-	M	-
Total and Dissolved Metals Scan (e)	M	-	M	-
96 hour Rainbow Trout single concentration toxicity test (g)	Q	-	-	-
48 hour <i>Daphnia</i> <i>magna</i> single concentration toxicity test (g)	Q	-	-	-
Flow(f)	-	-	-	C
Calcite Precipitation Propensity Monitoring	1X/2W	1X/2W	1X/2W	-
Rock Mass Monitoring (5)	-	1X/6W, as needed	1X/6W, as needed	-

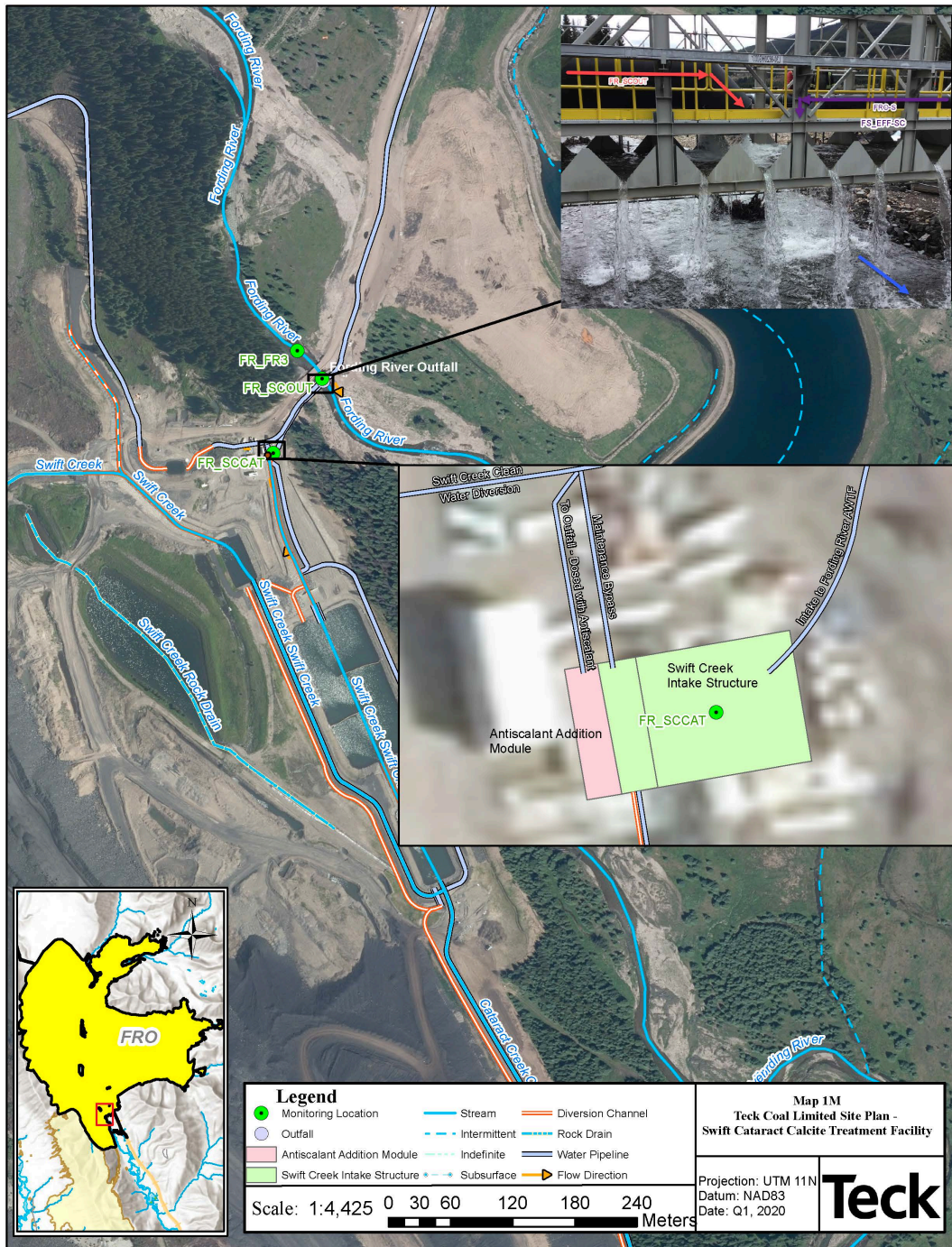
- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Samples are to be collected only when there is discharge via overflow from the FRO AWTF-S Swift Creek Intake. If the discharge is initiated because of a recirculation event at FRO-S AWTF, the monitoring program is not effective during the first four (4) hours of the recirculation event.
- 4) Monitoring location appears in three monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in Section 9, Appendix 4 and Appendix 5.
- 5) Rock mass monitoring to be conducted on an as-needed basis as a confirmatory measure of the more frequent calcite monitoring methods.

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5C3 SWIFT-CATARACT ANTISCALANT ADDITION SYSTEM SITE PLAN



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APPENDIX 5D – LCO Dry Creek Antiscalant Addition System

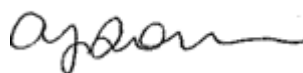
Additional requirements are detailed in Appendix 5A.

5D1 AUTHORIZED DISCHARGES

This section applies to the discharge of effluent from the LCO Dry Creek Antiscalant Addition System to Dry Creek. The LCO Dry Creek Antiscalant Addition System influent is Dry Creek Sediment Pond effluent. The site reference number for this discharge is E295211 (LC_SPDC) as shown in Appendix 5D4.

- 5D1.1 Treated effluent discharged at E295211 must always not be acutely toxic, as per Section 6.2.
- 5D1.2 Treated effluent at E295211 must not exceed an antiscalant concentration of 25 mg/L based on a two-minute time-weighted average, according to the sampling and calculation procedure in the Operations Plan.
- 5D1.3 Notification of deviation from the identified antiscalant in the Teck application “Line Creek Operations Dry Creek Calcite Management Project” dated May 8, 2020 must be provided to the director and KNC prior to implementation.
- 5D1.4 The discharge is authorized from Authorized Works which are: antiscalant addition module, the combined effluent pipeline, and related appurtenances approximately located as shown in Appendix 5D4.
- 5D1.5 The LCO Dry Creek Antiscalant Addition System may operate intermittently, in accordance with the Operations Plan, as required to meet the Site Performance Objectives for Calcite per Section 3.4 and prevent acute toxicity failures per Section 6.2.

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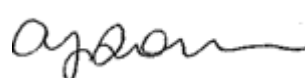


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5D2 DRY CREEK DOWNSTREAM MONITORING REVIEW

5D2.1 The permittee must provide an analysis and interpretation of monitoring results from Dry Creek downstream monitoring locations during the initial period of 12 months during project commissioning and operations to the director and KNC. The report must be submitted within 14 months of the project start date and include a recommendation for ongoing monitoring at these locations.

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5D3 LCO DRY CREEK ANTISCALANT ADDITION SYSTEM MONITORING PROGRAM

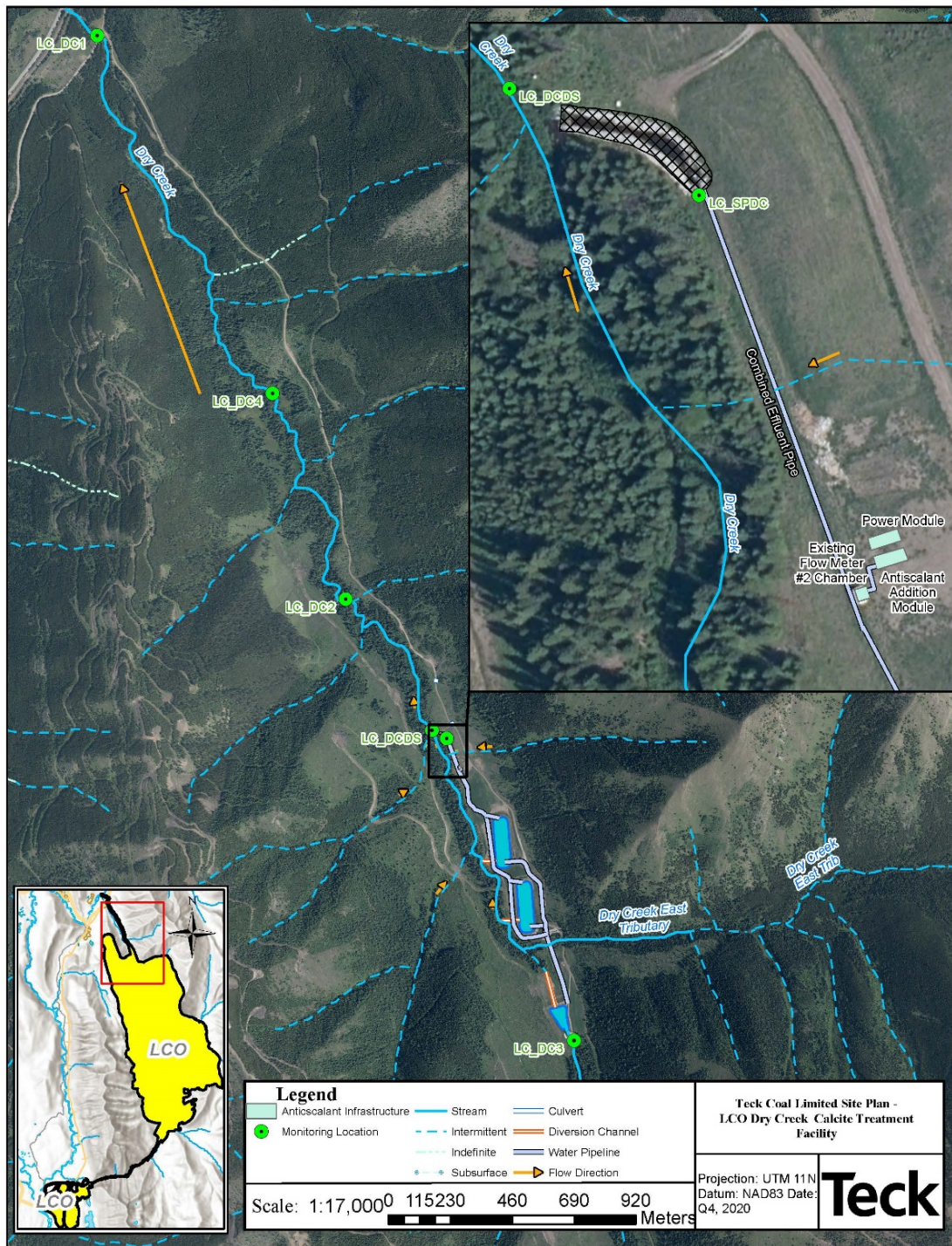
	LCO DRY CREEK U/S OF DCWMS HEAD POND	LCO DRY CREEK SEDIMENT POND COMBINED EFFLUENT D/S OF ANTISCALANT ADDITION (Effluent)	LCO DRY CREEK 30 M D/S OF DCWMS DISCHARGE LOCATION IN REACH 4 (Downstream in receiving environment)	LCO DRY CREEK 0.6 KM D/S OF DCWMS IN REACH 3 (Downstream in receiving environment)	LCO DRY CREEK 1.5 KM D/S OF DCWMS IN REACH 3 (Downstream in receiving environment)	LCO DRY CREEK 0.5 KM U/S OF FORDING RIVER IN REACH 1 (Downstream in receiving environment)
<i>EMS Number</i>	<i>E288273</i>	<i>E295211</i>	<i>E295210</i>	<i>200335</i>	<i>200044</i>	<i>E216142</i>
<i>Teck Station ID</i>	<i>LC_DC3</i>	<i>LC_SPDC</i>	<i>LC_DCDS</i>	<i>LC_DC2</i>	<i>LC_DC4</i>	<i>LC_DC1</i>
PARAMETER						
Field Parameters ^(a)	M	M	M	-	-	-
Conventional Parameters ^(b)	M	M	M	-	-	-
Major Ions ^(c)	M	M	M	-	-	-
Nutrients ^(d)	M	M	M	-	-	-
Total and Dissolved Metals Scan ^(e)	M	M	M	-	-	-
96 hour Rainbow Trout single concentration toxicity test ^(g)	-	Q	-	-	-	-
48 hour <i>Daphnia magna</i> single concentration toxicity test ^(g)	-	Q	-	-	-	-
Flow ^(f)	-	C	-	-	-	-
Calcite Precipitation Propensity Monitoring	M	M	M	M	M	M
Rock Mass Monitoring (4)	1X/6W, as needed	-	1X/6W, as needed	-	-	1X/6W, as needed

- 1) Refer to Table 26, Appendix 3, for abbreviation description.
- 2) Refer to Table 27, Appendix 3, for explanatory notes.
- 3) Refer to Section 8.5.1 and the approved annual calcite monitoring program for Calcite Index Monitoring requirements.
- 4) Rock mass monitoring to be conducted on an as-needed basis as a confirmatory measure of the more frequent calcite monitoring methods.
- 5) If monitoring locations appear in multiple monitoring tables in this permit, monitoring data must be reported according to the requisite reporting requirements in Appendix 5 and the other associated sections.

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5D4 **LCO DRY CREEK ANTISCALANT ADDITION SYSTEM SITE PLAN**



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