Upper Lillooet Hydro Project

Weekly Environmental Monitoring Report #76

Reporting Period: October 18 – October 24, 2015

Upper Lillooet River Hydroelectric Facility (Water File No. 2002561, Water licence No. C130613), Boulder Creek Hydroelectric Facility (Water File No. 2003049, Water licence No. C129969) & Transmission Line (TX Line)

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Owner Construction Permits and Approvals

Environmental Assessment Certificate No. E13-01 (Amendment 1, 2, 3, 4, 5 & 6)
Fisheries Act Subsection 35(2)(b) Authorization No. 09-HPAC-PA2-000303 (Amendment 1, 2)
Letter of Advice for the Transmission Line No. 09-HPAC0-PA2-000303
Leave To Commence Construction (ULRHEF) File No. 2002561
Leave To Commence Construction (BDRHEF) File No. 2002453
Leave To Commence Construction (TX Line) File No. 2002561/2002453
Conditional Water Licence (ULRHEF C130613) File No. 2002561
Conditional Water Licence (BDRHEF C129969) File No. 2002453
Conditional Water Licence (BDRHEF C131153) File No. 2003601
Licence of Occupation (ULRHEF #232384) File No. 2409871
Licence of Occupation (BDRHEF #232386) File No. 2409998
Licence of Occupation (TX Line #2423386) File No. 2410654
Occupant Licence to Cut (ULRHEF Amendments 1, 2, 3, 4, 5, 6, 7) No. L49717
Occupant Licence to Cut (BDRHEF – KM 38 laydown) No. L49698
Occupant Licence to Cut (BDRHEF Amendments 1, 2, 3) No. L49816
Occupant Licence to Cut (TX Line Amendment 1, 2, 3, 4, 5, 6, 7, 8, 9) No. L49697
General Wildlife Measure Exemption Approval Letter (TX Line & BDRHEF) File No. 78700-35/06 UWR and 39585-20 WHA
Heritage Conservation Act – Alteration Permit (ULRHEF) File No. 11200-03/2014-0033
Road Use Permit No. 6123-13-02 (Lillooet River FSR); 5673-13-01 (Rutherford Creek FSR); 7977-13-01 (Lillooet South FSR); 8015-13-01 (Ryan River); 8188-13-01 (Pemberton Creek FSR); and 9717-13-01 (Miller Bench FSR)
Junction Permit (ULRHEF & BDRHEF) File No. 11250-32/6123 (Amendment 1)
Aeronautical Obstruction Approval (Tx Line - Lillooet River Crossing) File No. 2013-004
Aeronautical Obstruction Approval (Tx Line - Ryan River) File No. 2013-005
Aeronautical Obstruction Approval (Tx Line - North Miller) File No. 2013-006
Aeronautical Obstruction Approval (Tx Line - South Miller) File No. 2013-007
Aeronautical Obstruction Approval (Tx Line - Pemberton Creek) File No. 2013-008
Aeronautical Obstruction Approval (Tx Line - Lillooet River near Pemberton) File No. 2013-009
Aeronautical Obstruction Approval (Tx Line - Lillooet River near Meager Creek) File No. 2013-010
Navigable Water Protection Act (ULRHEF) File No. 8200-2009-500434-001
Navigable Water Protection Act (BDRHEF) File No. 8200-2012-501-032-001
Navigable Water Protection Act (Tx Line – North Creek) File No. 8200-2013-500103-001
Navigable Water Protection Act (Tx Line – Lillooet River) File No. 8200-2013-500101-001
Navigable Water Protection Act (Tx Line – Lillooet River) File No. 8200-2013-500102-01
Navigable Water Protection Act (Tx Line – Ryan River) File No. 8200-2013-500104-001
Navigable Water Protection Act (Tx Line – South Miller River) File No. 8200-2013-500100-001
Navigable Water Protection Act (Tx Line – Boulder Creek) File No. 8200-2013-500099-001
Navigable Water Protection Act – Extension Approval (ULRHEF, BDRHEF, Tx Line)
Navigable Water Protection Act (Bridge – Ryan River) File No. 8200-2013-500381
Navigable Water Protection Act (Bridge – Upper Lillooet Side Channel; Extension Approval) File No. 8200-2013-500383
Section 57 Authorization (ULRHEF) File No. 16660-20/REC202717
SLRD Temporary Use Permit No. 34 – Boulder Creek HEF
SLRD Temporary Use Permit No. 35 – Upper Lillooet River HEF
SLRD Building Permit (10864) – Upper Lillooet River HEF Powerhouse
SLRD Building Permit (10865) – Boulder Creek HEF Powerhouse
Works Permit for Construction within FSR Right-of-Way No. 6123-14-01
Works Permit for Construction within FSR Right-of-Way No. 7977-15-01
Section 52(1)(b) FRPA Authorization for Ryan River Wet Crossing File No. FOR-19400-01/2014
MOTI Permit to Construct, Use and Maintain Works Upon the Right-Of-Way of a Provincial Public Highway No. 2014-06099
Magazine Licence File No. UL76018 (Renewal 1)
Section 8 Approval – Short Term Use of Water File (Lillooet River and Tributaries) No. A2006123 (Amendment 1)

Contractor Construction Permits and Approvals

Waste Discharge under the Code of Practice for the Concrete and Concrete Products Industry under the Environmental Management Act (Authorization No. 107204) Tracking No. 326969 (Renewal 1)
Wildlife Act Permits – Pacific Tailed Frog Salvage Permit # SU15-164805; Fish Salvage Permit # SU15-174722
Fisheries and Oceans Canada – Anadromous Fish Salvage Permit #XR 178 2015
BC Safety Authority – Temporary Construction Electrical Service Permit EL-140698-2014
Municipal Wastewater Regulation - Authorization # 107032
Water Supply System Construction Permits – VCH-14-613 for Main Camp
Water Supply System Permit to Operate Issued July 30th, 2014 for Main Camp
Section 6(3) and Schedule 3 Wildfire Regulations Fire Exemption for Ryan River Bridge File No. 14350-07
SLRD Building Inspection Report dated August 13, 2014 - Construction Camp Building Permit No. 10830
Lillooet River FSR Temporary Road Closures Approval File No. 11250-32/6123 (Amendment 1, 2)
Lillooet South FSR Temporary Road Closures Approval File No. 11250-32/7977
SLRD Building Permits for Mechanic Shop (10862) and Carpentry Shop (10836) March 18, 2015
SLRD Building Permit Stages 1 - 4 – Boulder Powerhouse Architectural, Electrical and Mechanical (10865) October 8, 2015
SLRD Building Permit Stages 1 - 4 – Upper Lillooet Powerhouse Architectural and Mechanical (10864) October 6, 2015

ACRONYMS:

AMBNS	Active Migratory Bird Nesting Survey
Andritz	Andritz Hydro Canada Inc.
ANFO	Ammonia nitrate fuel oil (industrial explosive)
ASMP	Archaeological Sites Management Plan
ARD M/L	Acid Rock Drainage and Metal Leaching
BCEAO	British Columbia Environmental Assessment Office
BCWQG	British Columbia Water Quality Guidelines
BDRHEF	Boulder Creek Hydroelectric Facility
BG	Background
BKL	BKL Consultants Ltd.
CE	CRT-ebc Construction Inc.
DFO	Fisheries and Oceans Canada
DS	Downstream
EAC	Environmental Assessment Certificate
EAO	Environmental Assessment Office
Ecofish	Ecofish Research Ltd.
Ecologic	Ecologic Consulting
EIR	Environmental Incident Report
ESC	Erosion and Sediment Control
FAM	Field Advice Memorandum
FSR	Forest Service Road
Golder	Golder Associates
GWR	Mountain Goat Winter Range
Hedberg	Hedberg and Associates Ltd.
HWM	High water mark
IE	Independent Engineer (True North Energy)
IEM	Independent Environmental Monitor
INX	Innergex Renewable Energy Inc.
ISW	Instream Works
ITM	Environmental Issue Tracking Matrix
JEM	JEM Energy Ltd. (Delegate Independent Engineer)
LTC	Leave to Construct
MFLNRO	Ministry of Forests, Lands and Natural Resource Operations
MOE	Ministry of Environment
MOTI	Ministry of Transportation and Infrastructure
NCD	Non Classified Drainage
OLTC	Occupational License to Cut
PAG	Potentially Acid Generating
ROW	Right of Way
RVMA	Riparian Vegetation Management Area
SES	Sartori Environmental Services
SLRD	Squamish-Lillooet Regional District
Stringer Line	Temporary Backfeed Transmission Line
TX Line	Transmission Line
ULRHEF	Upper Lillooet Hydroelectric Facility
UWR	Ungulate Winter Range
VC	Valued Component
WEL	Westpark Electric Ltd.
WEMR	Weekly Environmental Monitoring Report
WHA	Wildlife Habitat Area
WQ	Water Quality

1.0 Summary of Site Inspections for Reporting Period

The table presented below summarizes the IEM team site presence, weather and monitoring locations by component:

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
Sunday, October 18	SE, DA, AS	Foggy, 12°C	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Road maintenance on the Lillooet River FSR and camp access road ***ULRHEF Intake*** • Rebar and formwork installation • Drilling, blasting and tunnel stabilization • Rock hammering/excavation of sluice foundation • Dewatering to sediment basins ***ULRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization • Sediment pond maintenance and enlargement ***ULRHEF Penstock*** • Welding from 2+800 to 3+200 • Backfill from 3+200 to 3+500 ***ULRHEF Powerhouse*** • Superstructure construction • Manifold installation • Excavation of the top portion of the protection berm began and stopped due to equipment malfunction ***BDRHEF Intake Access Ramp and Diversion Tunnel*** • Delivery of temporary bridge be installed to access the diversion tunnel ***BDRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***BDRHEF Powerhouse*** • Superstructure construction • Distributer and turbine housing installation • Construction of flood protection berm ***TX-Line*** • Segment 1 & 2 ➢ Removing damaged conductors • Segment 6 ➢ Hand clipping of conductors • Segment 14 ➢ Pole foundation preparation (Structures 369 & 370)
Monday, October 19	SE, DA	Overcast, 12°C	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Road maintenance on the Lillooet River FSR • Permanent PAG rock storage area - perimeter drainage installation ***ULRHEF Intake*** • Rebar and formwork installation • Drilling, blasting and tunnel stabilization • Dewatering to sediment basins ***ULRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization • Sediment pond maintenance and enlargement

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
			ULRHEF Penstock • Welding from 2+800 to 3+200 • Backfill from 3+200 to 3+500 ***ULRHEF Powerhouse*** • Superstructure construction • Manifold installation ***BDRHEF Intake Access Ramp and Diversion Tunnel*** • Excavation of blast rock for access ramp construction • Rock consolidation above diversion tunnel upstream portal ***BDRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***BDRHEF Powerhouse*** • Superstructure construction • Distributer and turbine housing installation • Construction of flood protection berm ***TX-Line*** • Segment 1 & 2 ➢ Post-fire repair works (Structures 3-15 & Boulder tap) • Segment 5 ➢ Address RVMA deficiencies (hand falling and debris removal) • Segment 6 ➢ Hand clipping of conductors • Segments 12 & 13 ➢ Road construction for roads 305 and 306
Tuesday, October 20	SE, DA, TH	Partly sunny, 14°C	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Road maintenance on the Lillooet River FSR • Permanent PAG rock storage area - perimeter drainage installation ***ULRHEF Intake*** • Rebar and formwork installation • Drilling, blasting and tunnel stabilization • Dewatering to sediment basins ***ULRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***ULRHEF Penstock*** • Welding from 2+700 to 3+200 • Backfill from 3+100 to 3+500 ***ULRHEF Powerhouse*** • Superstructure construction • Excavation of the top portion of the protection berm was completed • Manifold installation ***BDRHEF Intake Access Ramp and Diversion Tunnel*** • CTF salvage prior to instream excavation for temporary bridge abutment and access pad construction • Rock consolidation above diversion tunnel upstream portal ***BDRHEF Downstream Tunnel Portal*** • Superstructure works • Distributer and turbine housing installation • Boulder Protection Berm construction ***BDRHEF Powerhouse*** • Superstructure construction

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
			TX-Line • Segment 1 & 2 ➢ Post-fire repair works (Structures 3-15 & Boulder tap) • Segment 5 ➢ Address RVMA deficiencies (hand falling and debris removal) • Segment 6 ➢ Hand clipping of conductors • Segments 12 & 13 ➢ Road construction for roads 305 and 306 ➢ Structure 285 foundation construction
Wednesday, October 21	SE, DA, TH	Overcast, Rainy, 11°C	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Road maintenance on the Lillooet River FSR • Permanent PAG rock storage area - perimeter drainage installation ***ULRHEF Intake*** • Concrete pour for sluice and intake structure • Drilling, blasting and tunnel stabilization • Dewatering to sediment basins ***ULRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***ULRHEF Penstock*** • Welding from 2+700 to 3+200 • Backfill from 3+100 to 3+500 ***ULRHEF Powerhouse*** • Superstructure construction • Manifold installation ***BDRHEF Intake Access Ramp and Diversion Tunnel*** • Instream excavation for temporary bridge abutment and diversion tunnel access pad construction • Rock consolidation above diversion tunnel upstream portal ***BDRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***BDRHEF Powerhouse*** • Superstructure construction ***TX-Line*** • Segment 1 & 2 ➢ Post-fire repair works (Structures 3-15 & Boulder tap) • Segment 5 ➢ Address RVMA deficiencies (hand falling and debris removal) • Segment 6 ➢ Hand clipping of conductors • Segments 12 & 13 ➢ Road construction for roads 305 and 306 ➢ Structure 285 foundation construction
Thursday, October 22	SE, DA, TH	Sunny, 12°C	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Road maintenance on the Lillooet River FSR • Permanent PAG rock storage area - perimeter drainage installation ***ULRHEF Intake*** • Rebar and formwork installation • Drilling, blasting and tunnel stabilization • Dewatering to sediment basins ***ULRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
			ULRHEF Penstock • Welding from 2+700 to 3+200 • Backfill from 3+100 to 3+500 ***ULRHEF Powerhouse*** • Superstructure construction • Manifold installation ***BDRHEF Intake Access Ramp and Diversion Tunnel*** • Instream excavation for temporary bridge abutment and diversion tunnel access pad construction • Rock consolidation above diversion tunnel upstream portal ***BDRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***BDRHEF Powerhouse*** • Superstructure construction ***TX-Line*** • Segment 1 & 2 ➢ Post-fire repair works (Structures 3-15 & Boulder tap) ➢ Installation of aeronautical markers between structures 4 & 5 • Segment 5 ➢ Address RVMA deficiencies (hand falling and debris removal) • Segment 6 ➢ Hand clipping of conductors • Segments 12 & 13 ➢ Road construction for roads 305 and 306 ➢ Structure 285 foundation construction
Friday, October 23	SE, DA, AS, TH, MN	Sunny, 13°C	***Construction Camp, Laydown Areas and the Lillooet River FSR*** • Road maintenance on the Lillooet River FSR • Permanent PAG rock storage area - perimeter drainage installation ***ULRHEF Intake*** • Rebar and formwork installation • Drilling, blasting and tunnel stabilization • Dewatering to sediment basins ***ULRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***ULRHEF Penstock*** • Welding from 2+700 to 3+200 • Backfill from 3+100 to 3+500 ***ULRHEF Powerhouse*** • Superstructure construction • Manifold installation ***BDRHEF Intake Access Ramp and Diversion Tunnel*** • Instream excavation for diversion tunnel access pad construction • Bridge construction • Water treatment system installation ***BDRHEF Downstream Tunnel Portal*** • Drilling, blasting and tunnel stabilization ***BDRHEF Powerhouse*** • Superstructure construction ***TX-Line*** • Segment 1 & 2 ➢ Post-fire repair works (Structures 3-15 & Boulder tap)

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities

			• Segment 5
			  ➢ Address RVMA deficiencies (hand falling and debris removal)
			• Segment 6
			  ➢ Hand clipping of conductors
			• Segments 12 & 13
			  ➢ Road construction for roads 305 and 306
			  ➢ Structure 285 foundation construction
			• Segment 14
			  ➢ Hand falling between structures 333 – 336

Saturday, October 24	SE, AS, MN	Sunny, 10°C	***Construction Camp, Laydown Areas and the Lillooet River FSR***
			• Road maintenance on the Lillooet River FSR
			• Permanent PAG rock storage area - perimeter drainage installation
			ULRHEF Intake
			• Rebar and formwork installation
			• Drilling, blasting and tunnel stabilization
			• Dewatering to sediment basins
			ULRHEF Downstream Tunnel Portal
			• Drilling, blasting and tunnel stabilization
			ULRHEF Penstock
			• Placing penstock and welding from 3+850 to 4+115
			• Backfill from 3+100 to 3+800
			ULRHEF Powerhouse
			• Superstructure construction
			• Manifold installation
			BDRHEF Intake Access Road, Ramp and Diversion Tunnel
			• Diversion tunnel access pad construction
			• Water treatment system installation
			• Ditch work from KM4 – KM5 of the intake access road
			BDRHEF Downstream Tunnel Portal
			• Drilling, blasting and tunnel stabilization
			BDRHEF Powerhouse
			• Superstructure construction
			TX-Line
			• Segment 1 & 2
			  ➢ Post-fire repair works (Structures 3-15 & Boulder tap)
			• Segments 12
			  ➢ Structure 285 foundation construction

IEM Team Personnel: *TH – Tom Hicks; SS – Stephen Sims; BA – Blake Aleksich; DA – Danita Abraham; SE – Stephanie Ellis; AS – Anne Sutherland; MN – Mike Nicol*

2.0 Administrative Summary

Key communications and meetings the IEM team had with the licensees, contractors and/or environmental authorities:

Date	Communication Type	Participants	Issues Discussed	ITM ID No.
October 18 - 20	*Emails, report*	CE, SES, INX, BC EAO, MFLNRO, Lil'wat Nation	CE prepared a draft and a final Environmental Incident report (EIR #16) was submitted to regulatory agencies. The incident involved the execution of instream work at the BDRHEF intake (non-fish bearing), without adequate notification or IEM presence onsite.	-
October 20	*Pre-work meeting*	CE, SES, INX	A pre-work meeting was held to review the revised work plan and environmental mitigation strategies to be employed for the BDRHEF intake access pad and bridge abutment construction. As the work plan involved instream excavation, a CTF salvage was required and the IEM indicated that they may need to direct CE to alter the work pace to prevent downstream water quality impacts, in the event turbidity levels remained elevated for more than two consecutive hours without returning to background levels.	-
	Email	INX, JEM, SES	In accordance with the Landslide Risk Management Plan and addendums, INX distributed the QP prepared post-fire rainfall event inspections for the ULHP.	-
October 21	*Email*	INX, SES, WEL	INX and WEL provided the IEM with an update on the current access road conditions and the schedule for the completion of seasonal road deactivation.	-
	Email	SES, CE, INX	The IEM requested that CE re-establish the distribution of a weekly schedule outlining when environmental sensitive works are occurring, and where & when IEM presence is required.	-
	Email	INX, SES, CE, JEM	INX distributed an update on the testing of blast rock from the ULRHEF upstream and downstream tunnel headings and the BDRHEF downstream tunnel heading. Recent lab tests confirm that these materials are classified "non-PAG".	-
	Site Visit	INX, SES, CE, Hedberg	A site visit was conducted to review the draft revegetation and restoration plans prepared by CE and their QP.	-
October 22	*Pre-work meeting*	SES, CE, INX	A pre-work meeting was held to review the design and installation procedure for the BDRHEF diversion tunnel upstream portal access bridge. The temporary bridge was designed to be removed quickly in the event that the water levels in Boulder Creek raise and pose a risk to the bridge or its abutments.	-
	Meeting	INX, SES, CE	Following the site visit, a meeting was held to discuss the revegetation and restoration plans prepared by CE and their QP and discuss edits required to meet CEMP and permit requirements.	-

3.0 Current Work Restrictions and Timing Windows

The table presented below outlines work restrictions applicable during the reporting period for each active Project component location:

Component	Location	Wildlife/Archeology Concern	Construction/Timing Restrictions & Mitigations
TX Line	Segment 6	Within 500 m of South Creek & Rohb Creek	Construction of the transmission line within 500 m of South Creek & Rohb Creek, must be conducted outside the salmon migration period (October 15 – December 31).
	Segments 6 – 14	Within 150m of wetlands or 100m of Coastal Tailed Frog Streams	IEM presence is required when clearing within 150m of wetlands or 100m of CTF Streams, to ensure clearing areas are minimized.
		Riparian Vegetation Management Areas (RVMA)	IEM monitoring is required during clearing within RVMAs.
		Surface Water Quality	IEM monitoring is required during culvert installation activities in non-fish bearing waters to document adherence to the Surface Water Quality Protection Plan objectives.
		Suitable Class 1 & 2 Grizzly Bear forage habitat	IEM monitoring is required when clearing within identified Class 1 & 2 Grizzly Bear forage habitat, to ensure clearing areas are minimized.
		Ryan River Drainage	Construction of the TX Line into and across the Ryan River drainage will occur during the less critical Grizzly Bear summer foraging period (June 1 – September 1).
Lillooet River FSR & ULRHEF	Access roads above the lower limit of the 200m buffer Truckwash Creek Migration Corridor to the ULRHEF intake	Mountain Goat UWR & Migration Corridor	If a goat observation occurs within 500 m line-of-sight of construction activities, construction must cease for at least 48 hours. The IEM must record and submit all goat observations to FLNR within 48 hours.

4.0 Upper Lillooet River HEF – Monitoring Results

4.1 *Construction Camp, KM 38 Laydown, Access Roads, Permanent PAG rock Spoil Area & Lillooet River FSR*

Activities:

- Perimeter installation surrounding the permanent PAG rock storage area at KM 41.5 of the Lillooet River FSR (Photo 1).
- CE continued to operate a rock crusher/screening plant at KM 45 of the Lillooet River FSR (Photo 2).
- Routine maintenance of construction equipment within the mechanic shop and fuel management continued at the KM 38 laydown. All hazardous substance materials (waste

oil, contaminated soil, used oil/hydraulic fluid containers, etc.) were stored temporarily for off-site disposal in a designated area at the laydown. The materials were all well contained and protected from the weather.

- The electric fences surrounding the construction camp were maintained and operational throughout this reporting period.

Environmental Summary:

- The IEM discussed with CE environmental managers that access road and FSR drainages require maintenance in some areas. CE committed to accessing ditches and culverts along the Lillooet River FSR and project access roads to maintain compliance with the Surface Water Quality Management Plan.

Photos:

Photo 1 – Ditching and drainage armouring around the permanent PAG rock stroage area. (October 22, 2015).

Photo 2 – Conditions at the KM 45 crusher pad that has been installed on top of the rock spoil pile (October 22, 2015).

4.2 *Intake (North & South Sides), and Upstream Tunnel Portal*

Construction Activities:

- Rebar and formwork installation (Photo 3).
- Concrete pours for sluiceway structure (Photo 4).
- Drilling, blasting, mucking, and tunnel stabilization at the ULRHEF upstream portal (Photo 5).
- Dewatering to ULRHEF intake sediment basins (Photo 6).

Environmental Summary:

- All turbid or alkaline water resulting from activities at the ULRHEF intake or upstream tunnel portal is pumped to the ULRHEF intake sediment basins (Photo 6). A dedicated CE crewmember is present to monitor the pumps within the intake work area and tunnel portal during active construction works. This person has the responsibility of directing all turbid or alkaline water to the sediment ponds and must verify with CE environmental staff or the IEM

prior to directing any water to the Lillooet River. All water in the intake sediment basins infiltrated to ground during this reporting period. The water has reached the last sediment basin cell.

Photos:

Photo 3 – Rebar and form work at the ULRHEF intake (October 21, 2015).

Photo 4 – Concrete pour at ULRHEF intake sluiceway location (October 21, 2015).

Photo 5 – Blast rock mucking at the ULRHEF upstream tunnel portal (October 21, 2015).

Photo 6 – Final two ponds of the ULRHEF intake water treatment ponds (October 22, 2015).

4.3 *Downstream Tunnel Portal*

Construction Activities:

- Drilling, blasting, mucking and stabilization works within the tunnel (Photo 7).
- Maintenance and continued dewatering to downstream tunnel portal settling ponds (Photo 8).

Environmental Summary:

- The downstream portal infiltration ponds were by-passed to the temporary ponds to permit CE to excavate and enlarge the existing ponds (Photo 8). The IEM recommends that CE

monitor the ponds to ensure they are functioning as intended. Typically, an infiltration pond is not lined with filter cloth at its base. Once the repair was completed, water was redirected to the ponds and no discharge to the surrounding environment was noted during this reporting period.

Photos:

Photo 7 – Current conditions at the ULRHEF downstream tunnel portal laydown (October 22, 2015).

Photo 8 – Maintenance of the ULRHEF downstream tunnel portal infiltration ponds (October 19, 2015).

4.4 *Penstock*

Construction Activities:

- Penstock installation and backfill continued from 2+700 to 3+900 (Photo 9).
- Penstock welding continued from 2+800 to 2+900 (Photo 10).

Environmental Summary:

- No environmental issues were observed or reported at the ULRHEF penstock during this reporting period.

Photos:

Photo 9 – Penstock backfill works near 2+900 (October 24, 2015).

Photo 10 – Penstock welding near 2+900 (October 24, 2015).

4.5 *Powerhouse & Access Road*

Construction Activities:

- Excavation of the top portion of the ULRHEF powerhouse flood protection berm (Photo 11).
- Powerhouse superstructure construction began during this reporting period (Photo 12).

Environmental Summary:

- On October 20 and 21, 2015 CE completed excavation of the top portion of the powerhouse flood protection berm. The IEM missed monitoring a portion of this work activity due to mis-communication between the IEM and CE. As a result, the IEM has requested that CE re-start their daily email scheduling updates. CE was able to complete all works well above the water line and HWM. CE was able to prevent material for entering the Lillooet River by placing the large boulders excavated from the berm along the riverside edge of the excavation (Photo 11). No environmental concerns were noted by the IEM.

Photos:

Photo 11 – Excavation of the top of the flood protection berm (October 21, 2015).

Photo 12 – ULRHEF powerhouse superstructure installation (October 22, 2015).

4.6 *Water Quality Results*

The following table presents the results of the routine WQ sampling program for the ULRHEF. The IEM is undertaking a weekly monitoring program according to the conditions outlined in the Surface Water Quality Protection Plan. The regular monitoring sites quantify WQ conditions within the Lillooet River upstream and downstream of active construction areas. The IEM acknowledges the natural variability of instream WQ conditions in the Lillooet River due to seasonal melt fluctuations and large tributary inputs. In the event that an exceedance of *in-situ* WQ (turbidity and/or pH) is deemed to be caused by project-related activities, the IEM will highlight the exceedance, discuss the cause, and outline measures undertaken by the Contractor to correct the issue. When an exceedance cannot be attributed to project related activities, the exceedance will be marked by an asterisk (*).

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (*u*S)	Temp (°C)
Routine Water Quality						
October 24, 2015	16:02	ULR Background – ULRHEF Intake	7.0	44.2	48	5.1
	16:18	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	7.1	48.2	52	5.5
	15:45	ULR # 1 – Upstream of ULRHEF Powerhouse	7.1	40.3	100	5.6
	15:35	ULR #2 – Downstream of ULRHEF Powerhouse between KM 40.5 and KM 41	7.3	39.4	100	5.6
	15:07	ULR #3 – Lillooet River FSR KM 38 Laydown – D/S of Boulder confluence	7.0	33.8	95	4.9
	14:23	ULR #4 – Lillooet River FSR KM 24 – D/S of all works and Meager confluence	6.7	37.2	114	6.1

4.7 *Recommendations*

IEM recommendations for the ULRHEF are as follows:

- The IEM requested re-instatement of the CE's daily email scheduling updates to improve communications and to allow for the planning of sufficient IEM coverage for environmentally sensitive work activities.
- All seepage water in the intake excavation and portal should be conveyed to the sediment basins unless approved for discharge directly to the Lillooet River by the IEM or CE environmental manager.
- The IEM recommends that the access roads and tributaries on the penstock alignment be monitored regularly to ensure that no ESC issues develop with the continued installation works and traffic.
- Maintenance of the downstream portal infiltration ponds is complete. The IEM recommends that CE continue to monitor the function of the ponds and ensure continued adherence to the Surface Water Quality Management Plan.
- The ULRHEF powerhouse sump water should be monitored regularly. Alkaline or turbid water should be pumped to the settling ponds for treatment.

4.8 *Upcoming Works*

The following new and/or environmentally sensitive construction activities are scheduled to occur at the ULRHEF in the upcoming reporting period(s):

- Tunneling activities will continue at the ULRHEF intake portal.
- Rebar and formwork installation will continue at the ULRHEF intake.
- Dewatering to the ULRHEF intake sediment basins will continue.
- Tunneling activities will continue at the ULRHEF downstream tunnel portal.
- Penstock installation will continue.
- Superstructure installation will continue at the ULRHEF powerhouse.

5.0 Boulder Creek Hydroelectric Facility – Monitoring Results

5.1 *Intake Access & Diversion Tunnel*

Construction Activities:

- Instream excavation to construct access to the diversion tunnel portal began on October 20, 2015 following a CTF salvage (Photo 13). The instream works included excavation within the channel (Photo 15) to narrow and deepen the channel to permit the installation of a temporary bridge (Photo 16) that will be used to access the upstream end of the diversion tunnel (Photo 18).
- Rock consolidation works on the left bank above the upstream diversion tunnel portal (Photo

14).

- CE began installation of an active water treatment system on October 24, 2015. The treatment system will be used during construction of the diversion tunnel (Photo 17).

Environmental Summary:

- On October 1, 2015 the IEM installed a noise meter to monitor noise generated by construction activities at the BDRHEF intake, which are within UWR UL 12. The data collected will be used to inform the contractor of noise levels generated during work at the intake and will help guide adaptive management strategies if noise levels are consistently above the 75dBA noise level threshold.
- The IEM was onsite to monitor water quality and direct work pace to ensure the protection of surface water quality through the works (October 20-24, 2015). The following protocol was discussed prior to the start of works at the pre-work meeting and was employed throughout instream excavation works:
  - The IEM measured turbidity levels at 20-minute intervals during the first hour of instream works and advised CE to slow the work pace if turbidity levels exceeded BCWQGs at the downstream monitoring location.
  - If turbidity levels were above BCWQGs after 2 hours of instream work the IEM advised CE to stop works until water quality levels returned to within 8 NTU of background levels. Once turbidity levels returned to within 8 NTU of background level, CE was advised that works could resume.
- CE was able to complete the instream works required to access the upstream diversion tunnel portal according to the above protocol. Water quality monitoring data is appended to the end of this report. Based on the water quality monitoring results the IEM feels that water quality was protected to the extent practical throughout the works.
- CE removed the majority of blast rock lost to the river during blasting of the intake access ramp while performing instream excavation to construct access to the upstream diversion tunnel portal. The remainder of the blast rock will be excavated prior to constructing the intake structure, and once Boulder Creek is diverted through the diversion tunnel.

Photos:

Photo 13 – CTF salvage being conducted at the BDRHEF intake prior to instream works (October 20, 2015).

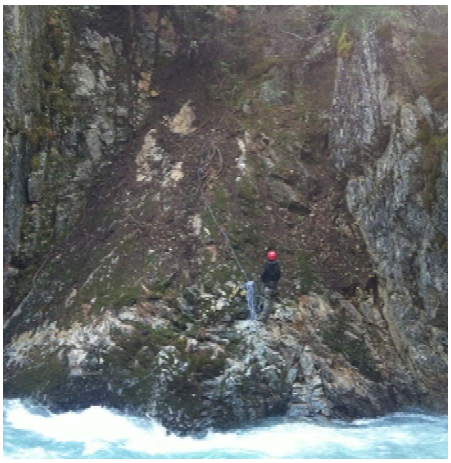

Photo 14 – Rock consolodation work on left bank above the upstream diversion tuneel portal (October 20, 2015).

Photo 15 – Instream excavation at the BDRHEF intake (October 20, 2015).

Photo 16 – Upstream diversion tunnel portal access bridge installation at BDRHEF intake (October 23, 2015).

Photo 17 – Installation of the Sumas water treatment system in preparation for tunneling activities (October 23, 2015)

Photo 18 – Excavtion in isolation of flowing water at the upstream diversion tunnel portal face (October 24, 2015)

5.2 *Downstream Tunnel Portal and Powerhouse*

Construction Activities:

- BDRHEF powerhouse superstructure construction (Photo 19).
- Construction of the BDRHEF flood protection berm (Photo 20).
- Drilling, blasting, mucking and stabilization works within the tunnel.
- Dewatering of the tunnel and powerhouse to the oil water separator and settling ponds continued.

Environmental Summary:

- CE completed construction of the BDRHEF flood protection berm during this reporting period. All works were completed in isolation of flowing water and no water quality impacts to Boulder Creek were observed.
- All wastewater related to the BDRHEF tunnelling works continued to be contained and conveyed to the downstream portal settling ponds for treatment. The water in the settling ponds continues to infiltrate to ground and has yet to reach the fourth cell.

Photos:

Photo 19 – BDRHEF powerhouse structure works (October 20, 2015).

Photo 20 – Construction fo the toe of the BDRHEF powerhouse flood protection berm (October 18, 2015).

Photo 21 – Armouring of the upstream end of the BDRHEF powerhouse flood protection berm (October 9, 2015).

5.3 *Water Quality Results*

The following table presents the results of the routine WQ sampling program for the BDRHEF. The IEM is undertaking a weekly monitoring program according to the conditions outlined in the Surface Water Quality Protection Plan. The regular monitoring sites have been selected to quantify WQ conditions within Boulder Creek upstream and downstream of active construction areas. The IEM acknowledges the natural variability of instream WQ conditions in Boulder Creek due to seasonal fluctuations in snowmelt. In the event that an exceedance of *in-situ* WQ (turbidity and/or pH) is deemed to be caused by project-related activities, the IEM will highlight the exceedance, discuss the cause, and outline measures undertaken by the Contractor to correct the issue. When an exceedance cannot be attributed to project related activities, the exceedance will be marked with an asterisk (*).

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (uS)	Temp (°C)
Routine Water Quality						
October 24, 2015	7:30	BDR BG – Upstream of BDRHEF intake *not currently accessible*	7.3	2.8	11	5.2
	-	BDR #1 – Downstream of BDRHEF intake *not currently accessible*	-	-	-	-
	17:00	BDR #2 – Upstream of BDRHEF Powerhouse	7.2	5.4	104	5.3
	17:15	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	7.3	6.9	110	5.3

5.4 *Recommendations*

IEM recommendations for the BDRHEF are as follows:

- All wastewater related to the BDRHEF tunnelling works should continue to be contained and conveyed to the downstream portal settling ponds for treatment. Regular inspections of the treatment ponds should be performed to ensure the necessary maintenance activities outlined in the work plan are performed.

5.5 *Upcoming Works*

The following new and/or environmentally sensitive construction activities are scheduled to occur at the BDRHEF in the upcoming reporting period(s):

- Blasting and excavation works will begin for the BDRHEF intake diversion tunnel.
- BDRHEF downstream portal tunnelling works will continue.
- Superstructure construction will continue.

6.0 Transmission Line – Monitoring Results

6.1 *Transmission Line Construction Activities*

Right-of-Way Clearing:

- Hand falling and debris clearing in Segment 5 RVMAs to address minor deficiencies (Photo 22).
- Hand falling for structures 333 – 336 in Segment 14.

Existing Road Upgrades and Access Road Construction

- Seasonal road deactivation in Segment 11.
- Road construction on Road 305 in Segment 12.
- Road construction on Road 306 in Segment 13.

Transmission Line Pole Installation, Line Stringing and Clipping

- Post Wildfire repairs in Segments 1 and 2 including removing damaged poles and conductors; and completing the necessary re-installations (Photo 23).
- Installation of aeronautical markers in Segment 1 between structures 4 – 5 (Photo 24).
- Hand clipping conductors in Segment 6.
- Groundworks for pole foundations in Segments 12 and 14.

Environmental Summary:

- The IEM was present as required when clearing activities occurred within 150m of wetlands, 15m RVMAs (30m for CTF streams), 100m of Coastal Tailed Frog Streams, Class 1 & 2 suitable Grizzly Bear WHA and/or suitable forage habitat, moose and deer UWR, legally designated Old Growth Management Areas (OGMAs) or within Northern Goshawk, Spotted Owl or Western Screech-Owl nesting habitat (during breeding season). All flagged boundaries were respected during clearing activities. No environmental issues were observed.

Photos:

Photo 22 – Cleaning and hand falling in RVMA 103a (October 19, 2015).

Photo 23 – Post wildfire repair works in Segment 1 (October 22, 2015).

Photo 24 – Aeronautical markers being installed in Segment 1 between structures 4 – 5. (October 22, 2015)

6.2 *Water Quality Results*

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (uS)	Temp (°C)
No construction activities involving water management were conducted during this reporting period.						

6.3 *Recommendations*

- The IEM has no recommendations at this time.

6.4 *Upcoming Works*

- Post-wildfire rebuild works in Segment 1 and 2.
- Clipping conductors in Segment 6.

- Road construction in Segment 12 and 13.
- Hand falling in Segment 14.

7.0 Wildlife Sightings

As per the CEMP, a wildlife sightings record has been implemented and will be updated regularly by Project Personnel. It is mandatory for all personnel to report wildlife sightings including, but not limited to bears, cougars, mountain goats and deer. Wildlife sighting will be reported and recorded by the contractor(s). Wildlife Observation forms will be included in first reporting period following month end. Observation or detection of the following species will trigger notification to identified parties according to the following table.

Species Observed or Detected	Notification Period	Agencies to be Notified
Northern rubber boa	Immediately	IEM, Owner
Grizzly bear	24hrs	IEM, Safety Officer, Conservation Officer, Owner
Wolverine den	24hrs	IEM, MFLNRO, Owner
Spotted owls	24hrs	IEM, MOE, Owner
Mountain goats	48hrs	IEM, MFLNRO, Owner

8.0 Mountain Goat Monitoring Program

The following mitigation measures related to mountain goats were implemented during this monitoring period:

- Noise level monitoring commenced one month earlier to collect data to be used to adaptively manage construction noise and ensure that the 75db noise level threshold is not exceeded as outlined in the Mountain Goat Management Plan.
- As of October 2, the IEM or designate was on site to monitor Mountain Goat activity within 500m of construction activities at the ULRHEF intake and the ULRHEF downstream tunnel portal. The mountain goat monitoring program was initiated a month early to collect information on mountain goat movement and activities post Boulder Creek Wildfire (V30241). Mountain goats were monitored from four sites:
  - Truckwash Creek viewing river right of the Migration Corridor– MG-OBS01 (10U 467955 5612773):
  - Keyhole Falls viewing the south side u-2-002 UL11 – MG-OBS02 (10U 466593 5613988);
  - Garibaldi Pumice mine site viewing u-2-002 UL 19 – MG-OBS03 (10U 467388 561408); and,
  - Salal Creek monitoring site viewing u-2-002 UL 8 – MG-OBS04 (10U 466133 5613991).

Monitoring effort was split between all sites during daylight hours, unless safety concerns or weather conditions interfered. The order of site visits rotated daily. Construction activities must cease if a goat(s) are observed moving towards the ULRHEF intake and/or if a goat(s) are observed within a 500m line of site of a construction activity. No goats were observed within 500m line of sight of construction activities and no work stoppages were required.

9.0 Environmental Issues Tracking Matrix (ITM)

9.1 *Hydroelectric Facilities (ULRHEF & BDRHEF)*

ITM Tracking Legend:	*Work Item Open*
	Work Item Complete
	Issue Closed

Issue Tracking		Environmental Issue		Mitigation Measures			
ID No.	Status	Location	Issue Description	Action Taken/Recommended	Date of Identification	Targeted Date for Completion	Date Completed
No outstanding environmental issues (next ITM – ULR#25)							

9.2 *Transmission Line*

ITM Tracking Legend:	*Work Item Open*
	Work Item Complete
	Issue Closed

Issue Tracking		Environmental Issue		Mitigation Measures			
ID No.	Status	Location	Issue Description	Action Taken/Recommended	Date of Identification	Targeted Date for Completion	Date Completed
No outstanding environmental issues (next ITM – Tx#3)							

Oct. 20th Boulder Intake Instream Excavation - Sunny, 16°C, Water temp = 5.2°C			
Location	**Time (24hr)**	**Turbidity (NTU)**	**Notes**
Background	11:45	5.24	pH = 7.6; Temp = 5.2°C
~25-30m downstream of works	11:55	7.61	Preparing working pad on right right; minimal instream excavation
~25-30m downstream of works	12:15	12.4	Start of excavation instream
~25-30m downstream of works	12:35	5.56	Break for lunch
~25-30m downstream of works	12:50	7.42	Excavation instream resumed
~25-30m downstream of works	13:10	8.36	
~25-30m downstream of works	13:30	4.36	
~25-30m downstream of works	13:50	8.77	
~25-30m downstream of works	14:10	11.8	Short break
~25-30m downstream of works	14:55	6.06	
~25-30m downstream of works	15:15	**23.7**	Removed big blast rocks from river
~30-50m downstream of works	15:35	**41.9**	Deepened riverbed channel
~30-50m downstream of works	15:55	5.97	Short break
~30-50m downstream of works	16:15	**76**	
~30-50m downstream of works	16:35	**65.5**	Finished working instream at 16:30
~30-50m downstream of works	16:55	**14.9**	
~30-50m downstream of works	17:05	9.2	

Oct. 21st Boulder Intake Instream Excavation - Overcast, Rainy 13°C, Water temp = 5.6°C			
Location	**Time (24hr)**	**Turbidity (NTU)**	**Notes**
Background	11:10	3.45	pH = 7.24; Temp = 5.6°C
~25-30m downstream of works	11:25	5.77	Removing/Crushing big rocks
~25-30m downstream of works	11:45	6.28	Removing Big/Middle boulders
~20-25m downstream of works	12:05	5.94	Stopped work to change bucket
~20-25m downstream of works	13:10	**15.7**	Removed medium rocks
~20-25m downstream of works	13:30	**20.1**	
~20-25m downstream of works	13:50	7.12	
~20-25m downstream of works	14:10	**18.3**	Removed big boulder in river
~20-25m downstream of works	14:30	**15.8**	
~20-25m downstream of works	14:50	8.56	
~20-25m downstream of works	15:10	**23.4**	
~20-25m downstream of works	15:30	**30.6**	
~25-30m downstream of works	15:50	5.43	Rock hammering (Outside creek)
~25-30m downstream of works	16:10	**31.9**	
~25-30m downstream of works	16:30	**66.2**	Stopped works at 16:40
~25-30m downstream of works	16:50	5.02	

Oct. 22nd Boulder Intake Instream Excavation - Sunny, 12°C, Water temp = 4.7°C			
Location	**Time (24hr)**	**Turbidity (NTU)**	**Notes**
Background	7:50	4.77	pH = 6.95; Temp = 4.7°C
~25-30m downstream of works	8:00	**20.2**	
~25-30m downstream of works	8:20	7.27	Rock hammering (out of river)
~25-30m downstream of works	8:40	8.13	
~25-30m downstream of works	9:00	**37.1**	
~30-35m downstream of works	9:20	**42.5**	
~30-35m downstream of works	9:40	**15.3**	
~30-35m downstream of works	10:00	4.34	Stopped works for bridge kick-off
~30-35m downstream of works	10:30	**17.2**	
~35-40m downstream of works	10:50	**16.1**	
~35-40m downstream of works	11:10	**18.4**	
~35-40m downstream of works	11:30	**29.3**	1 hour of turbid water, slowed work pace (15mins work 5 min break)
~35-40m downstream of works	11:50	**17.1**	
~35-40m downstream of works	12:10	7.61	
~40-45m downstream of works	12:30	5.35	
~45-50m downstream of works	12:50	10.82	Rock hammering within 2m of river
~45-50m downstream of works	13:10	**18.5**	Rock hammering within 2m of river
~45-50m downstream of works	13:30	**22.6**	Rock hammering within 2m of river
~45-50m downstream of works	13:50	**13.7**	2 hours of turbid water, stopped works until clear
~45-50m downstream of works	14:10	7.43	
~55-60m downstream of works	15:10	4.65	
~55-60m downstream of works	15:30	5.14	
~55-60m downstream of works	15:50	4.35	Continued instream works
~65-70m downstream of works	16:10	**48.9**	
~70-75m downstream of works	16:30	**35.6**	Stopped works at 16:45
~70-75m downstream of works	16:50	**19.7**	
~70-75m downstream of works	17:10	9.82	

Oct. 23rd Boulder Intake Instream Excavation - Sun and Cloud, 13°C, Water temp = 5.2°C			
Location	**Time (24hr)**	**Turbidity (NTU)**	**Notes**
Background	7:30	2.78	pH = 7.3; Temp = 5.2°C
~60-65m downstream of works	7:40	**25.8**	
~50-55m downstream of works	8:00	9.12	
~40-45m downstream of works	8:20	**57.3**	
~50-55m downstream of works	8:40	**72.8**	
~40-45m downstream of works	9:00	**19.2**	
~40-45m downstream of works	9:20	**16.4**	1 hour with turbid water, advised operator to slow works
~40-45m downstream of works	9:40	**46.4**	
~40-45m downstream of works	10:00	**43.1**	
~40-45m downstream of works	10:20	**25.5**	Stopped works until water cleared
~40-45m downstream of works	10:40	7.3	
~40 & 100m downstream of works	11:00	**16**	2 excavators working instream
~40 & 100m downstream of works	11:20	**12.1**	
~40 & 100m downstream of works	11:40	**11.63**	
~40 & 100m downstream of works	12:00	**11.8**	
~40 & 100m downstream of works	12:20	9.72	
~100m downstream of works	12:40	8.55	
~100m downstream of works	13:00	**10.95**	Installed bridge abutments
~100m downstream of works	14:00	5.46	
~100m downstream of works	14:20	6.11	Installed steel girders
~100m downstream of works	15:40	4.35	
~100m downstream of works	16:10	5.85	
~100m downstream of works	17:10	5.04	
~50m downstream of works	18:00	4.36	
~50m downstream of works	19:00	4.37	Finished bridge at 19:15