
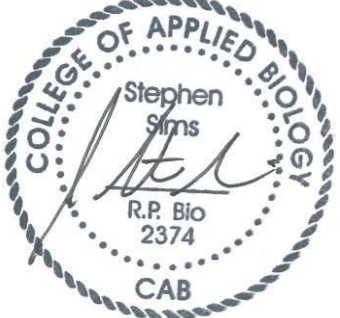


Upper Lillooet Hydro Project

Weekly Environmental Monitoring Report #109

Reporting Period: December 4 – 31, 2016

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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Carrie Lester	Lil'wat Nation	
		<p>Date Prepared: June 27, 2017 Date Submitted: August 15, 2017</p>

Owner Construction Permits and Approvals

Environmental Assessment Certificate No. E13-01 (Amendment 1, 2, 3, 4, 5, 6, 7)
 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 & Modification Agreement (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) No. L49717 (Amendments 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)
 Occupant Licence to Cut (BDRHEF – KM38 laydown) No. L49698
 Occupant Licence to Cut (BDRHEF) No. L49816 (Amendments 1, 2, 3)
 Occupant Licence to Cut (TX Line) No. L49697 (Amendments 1, 2, 3, 4, 5, 6, 7, 8, 9)
 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)
 Section 8 - Special Use Permit issued for the operation of an avalanche weather station on Crown land (File No. S25988)
 Special Use Permit issued for construction of the Lillooet River FSR 48km bypass road on Crown land (File No. S26115)

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. 349424 (Renewal 2)
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
Water Sustainability Act Section 10(1) Use Approval dated March 24, 2016
Section 7 Explosives Act – Magazine Licence (U76018) Renewal April 30, 2016

ACRONYMS:

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

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	Key Monitoring Locations & Activities
December 4 – 10, 2016	SE, MC, TJ, AS	<p>Construction Camp, Laydown Areas and the Lillooet River FSR</p> <ul style="list-style-type: none"> • Road maintenance and snow removal on the Lillooet River FSR • Creation of wildlife escape gaps every 100m on the Lillooet River FSR • KM42.5 Spoil pile reclamation • KM41.7 Culvert removal at PAG access road <p>ULRHEF Intake & Upstream Tunnel Portal</p> <ul style="list-style-type: none"> • Electrical works (Stringing fiber) • Obermeyer weir repairs • Radar sensor installation • Perimeter fence installation <p>ULRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Steel cable removal in the rock trap <p>ULRHEF Penstock</p> <ul style="list-style-type: none"> • Bulge repair (grouting, welding, painting, lining) • Truckwash Creek over-drain repairs, re-watering and riprap placement <p>ULRHEF Powerhouse</p> <ul style="list-style-type: none"> • Mechanical and electrical works • Switchyard works <p>BDRHEF Intake & Upstream Tunnel Portal</p> <ul style="list-style-type: none"> • Electrical works <p>BDRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Tunnel Plug rebar, formwork, and concrete works • Foundation preparation and flushing pipe installation <p>BDRHEF Powerhouse</p> <ul style="list-style-type: none"> • Electrical work associated with commissioning <p>TX-Line</p> <p>Segment 12</p> <ul style="list-style-type: none"> • Fiber optic cable splicing <p>Segment 16</p> <ul style="list-style-type: none"> • Pulling and splicing fiber optic cable • Closing jumpers
December 11 - 19, 2016	SE, AS, TJ	<p>Construction Camp, Laydown Areas and the Lillooet River FSR</p> <ul style="list-style-type: none"> • Road maintenance and snow removal on the Lillooet River FSR • Creation of wildlife escape gaps every 100m on the Lillooet River FSR • Electrical works (Pulling fiber) <p>ULRHEF Intake & Upstream Tunnel Portal</p> <ul style="list-style-type: none"> • Intake commissioning • Perimeter fence installation <p>ULRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Works complete <p>ULRHEF Penstock</p> <ul style="list-style-type: none"> • Bulge repair (grouting, welding, painting, lining) • Penstock walkthrough with CE to confirm clean-up after bulge repair (Dec. 15th) <p>ULRHEF Powerhouse</p> <ul style="list-style-type: none"> • Mechanical and electrical works • Second stage concrete works

		<ul style="list-style-type: none"> • Switchyard works BDRHEF Intake & Upstream Tunnel Portal • Electrical works BDRHEF Downstream Tunnel Portal • Foundation preparation and flushing pipe installation • Concrete works for the flushing pipe • Boulder spoil pile culvert installation BDRHEF Powerhouse • Electrical work TX-Line Segment 9 • Stringer line removal • Salmon main repairs Segment 12 • Fiber optic cable splicing Segment 14 • Fiber optic cable splicing Segment 16 • Pulling and splicing fiber optic cable
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IEM Team Personnel: SE – Stephanie Ellis; MC – Mike Champion; AS – Anne Sutherland; TJ – Tammy Jenkins

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.
December 5	Email	INX, SES	RE: Winter Access for BDR Intake & Access Road – INX requested that all parties involved review and sign the terms and conditions for the work procedure set out by Snowline’s mountain safety & rescue team for accessing Boulder Intake to complete commissioning activities during the winter months.	-
		SES, CE, INX, JEM	SES presented the laboratory results of the ULRHEF Penstock flush. The results show that the water collected can be safely discharged to ground in a designated infiltration area, and that no other flushes are necessary prior to filling the waterway. Follow-up water quality samples will be collected during the first commissioning activity that discharges water to the Lillooet River.	-
		INX, SES, JEM, CE, Andritz, Snowline	INX provided the IEM and CE with the Leave to Commence Diversion (LTCD) for the Upper Lillooet River HEF.	-
December 7	Kick-off Meeting	CE, SES, INX, Squamish Mills	A kick-off meeting was held to discuss snow removal operations between CE and Squamish Mills for the 2016/2017 winter season.	-
December 12	Kick-off Meeting	CE, SES, INX	A kick-off meeting was held for the BDRHEF spoil pile culvert installation	
	Email	CE, SES, INX	CE replied to an email from SES explaining why there was a large drainage ditch excavated between the conduit access road and the transmission line without IEM notification and outside the approved drawings. CE explained that they are currently in discussion with WEL to approve the ditch as a permanent structure.	ULR#63

Date	Communication Type	Participants	Issues Discussed	ITM ID No.
			CE responded to SES stating that materials improperly stored on the Truckwash Creek access road will be removed prior to the spring melt and stored at the spoil at KM42.5. Although this issue does not currently present an ESC concern it will be tracked as ULR#64 until the area can be inspected in the spring following snow melt.	ULR#64
		SES, CE, INX, JEM	The IEM circulated an update to the Issue Tracking Matrix. There are a number of ongoing issues that should be resolved in Spring 2017 as the snows recede.	-
December 13	Email	WEL, INX, SES	WEL notified the IEM that someone has recently established access past the slide at the 205a stream on the Salmon Main by cutting/removing debris and driving through the water and around the slide. WEL clarified that their crews were not responsible for this work. WEL completed fiber optic cable splicing beyond the slide by hiking up to the splicing location.	-
December 14	Email	INX, SES	INX informed SES of a natural landslide that occurred NW of the project. Increased turbidity levels persisted in the Lillooet River for two days.	-
		INX, CE, SES	INX requested that CE clear a pullout at KM1 of the Pebble Main spur road to accommodate the local trap line holder. CE ensured that the pullout would be cleared all winter.	-
December 15	Email	INX, SES, CE	INX requested an update from CE on the status of the winter schedule. CE forwarded a summary of works to SES and INX: <ul style="list-style-type: none"> • Sent out an emergency contact list • Construction operations stopping at end of day on Dec 19 • Dec 20, and throughout holiday break will be daily maintenance of camp, electrical fence, drinking water testing, pumps & generators and other daily duties to keep the camp running • Small crew will mob to site on Jan 3 to resume operations • Main crew will be back to site on Jan 9 • No Environmental Winter Form this season • Snow removal plan will be updated shortly 	-
	Email	MFLNRO, INX, SES, JEM, EAO, DFO, True North,	MFLNRO distributed an addendum to the ULRHEF Leave to Commence Diversion which was originally issued on November 21, 2016.	-
December 16	Email	SES, INX, Lil'wat Nation	SES informed the Lil'wat Nation that the 2016 Mountain Goat monitoring program is complete. Works in the Truckwash Creek migration corridor have finished and there will be no loud construction activities occurring at the ULR Intake for the rest of the winter season. SES will re-assess requirements for further monitoring next year when works resume.	-
December 19	Email	SES, CE, INX, JEM, Ecofish, KP	INX informed all parties that the headpond filling would be postponed until Jan 2017.	-

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
Lillooet River FSR, ULRHEF, & BDRHEF intake	Access roads above the lower limit of the 200m buffer to the Truckwash Creek Migration Corridor to the ULRHEF intake, as well as a portion of BDRHEF intake access road and intake structure within UWR u-2-002 UL 12	Mountain Goat UWRs & Migration Corridor	<p>Mountain goat monitoring activities will occur daily throughout the winter and spring (November 1 – June 15) when construction activities are occurring at the ULRHEF lower tunnel portal and/or the ULRHEF intake. The 2016 mountain goat monitoring program ended on December 16 as all construction activities at the ULRHEF lower tunnel portal and/or the ULRHEF intake are now complete.</p> <p>During winter months (November 1 – April 30), access to BDRHEF intake must be gated at least 500 m from UWR to restrict motorized use within the UWR, unless otherwise directed by MFLNRO.</p> <p>All intake works and construction, in or within 500 m of UWR u-2-002 UL 12, will not occur from November 15 to April 30.</p> <p>NOTE: BDRHEF intake is now in the commissioning phase and all construction activities are complete.</p> <p>If a mountain goat is observed within 500m line of sight of construction operations, construction must cease for at least 48 hours. Approval from the IEM must be obtained prior to recommencing construction activities, and the IEM must record and submit all goat observations to MFLNRO within 48 hours.</p>
TX Line	Segments 8 - 16	Mountain Goat UWRs SO-04 & SO-08	<p>If a mountain goat is observed within 500m line of sight of construction operations, construction must cease for at least 48 hours. Approval from the IEM must be obtained prior to recommencing construction activities, and the IEM must record and submit all goat observations to MFLNRO within 48 hours.</p>

4.0 Upper Lillooet River HEF – Monitoring Results

4.1 Construction Camp, KM38 Laydown, Access Roads & Lillooet River FSR

Construction Activities:

- CE continued routine fuel management and maintenance of construction equipment within the mechanic shop at the KM38 laydown. CE temporarily stored all hazardous substance materials (waste oil, contaminated soil, used oil/hydraulic fluid containers, etc.) in a designated area at the laydown prior to off-site disposal. The materials were all well contained and protected from the weather. CE continued to demobilize equipment from various locations around site in preparation for winter shutdown (Photo 1).

- Snow removal on the Lillooet River FSR and site access roads continued throughout this reporting period (Photo 2).
- CE removed the culvert at KM41.7 and decommissioned the PAG spoil pile access road (Photo 5 & Photo 6).

Environmental Summary:

- Snow management around the waste compactor, electric fences, and construction camp facilities were performed to maintain their operation following heavy snowfall during this reporting period. CE continues to remove snow and repair the electric fence following each snowfall (Photo 3). Wildlife escape gaps were created and maintained every 100m along the FSR after every storm system (Photo 4).
- Snow clearing occurred at intersections with the Lillooet River FSR that were identified by the local trap line holder as important areas for access and parking. CE endeavored to keep these areas clear of snow following each snowfall.
- On December 10, CE removed the temporary culvert at KM41.7 that connected the access road for the PAG spoil pile. The IEM was present for the works as a 3" pump was used to dewater the work area. An excavator equipped with bio-degradable hydraulic oil was used to remove the temporary culverts. The ditch was then reshaped and the pump was turned off to re-establish flow (Photo 5 & Photo 6). Flow was very minor and no downstream WQ affects were observed.

Photos:



Photo 1 – CE removal of excess penstock pipe from KM41.7 (December 10, 2016).



Photo 2 – Snow removal activities at KM49 on the Lillooet River FSR (December 19, 2016).



Photo 3 – Workers remove snow from roof of the kitchen after large storm (December 16, 2016).



Photo 4 – Wildlife escape gaps are maintained every 100m along the Lillooet River FSR (December 4, 2016).



Photo 5 – Removal of PAG spoil pile culvert at KM41.7 (December 10, 2016).



Photo 6 - Removal of PAG spoil pile culvert at KM41.7 (December 10, 2016).

4.2 Intake, Concrete Arch Foundation Walls, and Upstream Tunnel

Construction Activities:

- Installation of the radar lookdown flow sensor (DSI-Lookdown) at KM49, upstream of Keyhole Bridge (Photo 7).
- Intake dry commissioning works (gates, lockouts, trash rack rakes and other various components) in preparation for headpond filling in January 2017 (Photo 8).
- Installation of a gated perimeter fence around the ULRHEF intake (Photo 9 & Photo 10).

Environmental Summary:

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

Photos:



Photo 7 – Radar lookdown flow sensor at KM49 (December 9, 2016).



Photo 8 – Dry commissioning works at the ULRHEF Intake (December 15, 2016).



Photo 9 – Pole installation in preparation for perimeter fence (December 6, 2016).



Photo 10 – Installation of gated perimeter fence around ULRHEF Intake (December 15, 2016).

4.3 ***Downstream Tunnel Portal***

Construction Activities:

- Site demobilization was complete as of December 15, 2016.

Environmental Summary:

- CE has completely demobilized from the ULRHEF Downstream Tunnel Portal. Reclamation works will proceed in 2017 following the spring thaw (Photo 11). As a result the Mountain Goat Monitoring Program is complete for 2016 (See Section 8.0 for further details)

Photos:



Photo 11 – Winter conditions at the ULRHEF Downstream Tunnel Portal (December 15, 2016).

4.4 Penstock and Truckwash Creek Penstock Crossing

Construction Activities:

- CE repaired a bulge inside the penstock (Photo 12).
- Penstock walkthrough with CE and IEM to confirm bulge repair cleanup and penstock finalization (Photo 13).
- CE completed repair works on Truckwash Creek over-drain (Photo 14 -Photo 17).

Environmental Summary:

- During this reporting period CE finished the bulge repair works inside the penstock. The area was grouted, sandblasted and re-coated. The IEM and CE conducted a final walkthrough to ensure that the area was clean and ready for waterway filling (Photo 12 and Photo 13).
- CE commenced the repair work to the Truckwash Creek over-drain this reporting period. Extensive damages were caused by the storm system that passed through the area on November 8 - 9, 2016. Riprap and fill was washed away by a debris flow during the night, which left exposed sections of concrete encased penstock. CE diverted the creek away from the working area with pumps and a sump from December 2 - 4, which allowed works to continue in the dry (Photo 14). The existing geomembrane liner was exposed by hand and glued to the new portion of the liner. On December 6, a key was excavated down in the dry and the liner and fill were keyed in and covered with large riprap (900 – 1200mm) through the Truckwash creek alignment (Photo 15). The pumps were removed on December 9 and the over-drain repair was complete (Photo 17). The IEM was present to monitor all instream activities, and collected water quality samples at 15 minute intervals during commissioning of the over-drain. A pulse of turbid water (max = 91NTU) occurred

initially, but turbidity levels returned to within BCWQGs within 40 minutes. Additional water quality sampling results are available upon request.

- CE will replant the section of the reclaimed area adjacent to Truckwash Creek that was damaged in the flood in the spring of 2017 when the conditions permit.

Photos:



Photo 12 – Completed penstock repair (December 15, 2016).



Photo 13 – Final penstock walkthrough with CE (December 15, 2016).



Photo 14 – CE digging small sump at the Truckwash Creek over-drain (December 5, 2016).



Photo 15 – Excavating of key to install geomembrane at Truckwash Creek over-drain (December 6, 2016).



Photo 16 – Geomembrane and riprap placement at Truckwash Creek over-drain (December 7, 2016).



Photo 17 – Removal of pumps and rewatering of Truckwash Creek (December 9, 2016).

4.5 ***Powerhouse, Tailrace & Access Road***

Construction Activities:

- Mechanical and electrical works in the ULRHEF powerhouse (Photo 19).
- Second stage rebar and concrete works in the ULRHEF powerhouse.
- Switchyard works (Photo 19).

Environmental Summary:

- The IEM monitored construction activities throughout the monitoring period and observed no environmental issues.

Photos:



Photo 18 – Current conditions of the ULRHEF Powerhouse (December 11, 2016).



Photo 19 – Switchyard works (December 19, 2016).

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 IEM selected the regular monitoring to 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 fluctuations in snowmelt. In the event of an exceedance of in-situ WQ (turbidity and/or pH) because of 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, an asterisk (*) will be used to denote it.

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (µS)	Temp (°C)
Routine Water Quality						
December 7, 2016	14:20	ULR Background – ULRHEF Intake	7.9	8.6	112	0.0
	14:00	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	7.9	11.8	119	0.0
	12:59	ULR # 1 – Upstream of ULRHEF Powerhouse	7.9	14.0	120	0.0
	11:47	ULR #2 – Downstream of ULRHEF Powerhouse between KM40.5 and KM41	7.9	14.7	121	0.0
	11:30	ULR #3 – Lillooet River FSR KM38 Laydown – D/S of Boulder confluence	7.9	4.4	113	0.0
	8:45	ULR #4 – Lillooet River FSR KM24 – D/S of all works and Meager confluence	7.8	4.1	113	0.0
December 15, 2016	11:00	ULR Background – ULRHEF Intake	6.5	106.0	129	0.1
	10:40	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	6.8	105.0	143	0.1
	11:50	ULR # 1 – Upstream of ULRHEF Powerhouse	6.5	100.3	129	0.2
	12:05	ULR #2 – Downstream of ULRHEF Powerhouse between KM40.5 and KM41	6.7	109.7	127	0.2
	12:43	ULR #3 – Lillooet River FSR KM38 Laydown – D/S of Boulder confluence	6.9	124.1*	123	0.0
	17:00	ULR #4 – Lillooet River FSR KM24 – D/S of all works and Meager confluence	6.9	130.0*	120	0.0

4.7 Recommendations

IEM recommendations for the ULRHEF are as follows:

- CE should ensure that escape routes are plowed in road side snow berms at approximately 100 metre intervals to allow ungulates safe passage off of the FSR and worksite access roads.
- CE should ensure that all intersections used by the local trapper and public are cleared of snow with adequate room for parking according to the snow clearing plan. The IEM

understands that snow clearing following significant snow fall will be completed as soon as possible.

4.8 *Upcoming Works*

The following new and/or environmentally sensitive construction activities are scheduled to occur at the ULRHEF when the winter construction season resumes in January 2017:

- Snow removal and clearing of escape gaps along all areas of the Lillooet River FSR and access roads.
- Dry commissioning of the intake gates.
- Headpond and waterway filling.
- Repairs to road edge of the Lillooet River FSR (multiple sections between KM46 & KM48) remain outstanding and present as ESC risk once the spring melt begins. Any mobilization of side cast material during the spring melt will need to be re-assessed and the slopes repaired/stabilized prior to further erosion in the spring of 2017 (ULR#60).
- Mixed material placed on the permanent penstock access road (organics, soils, and snow) are to be removed to eliminate an ESC risk before spring melt begins in 2017 (ULR#64).

5.0 **Boulder Creek Hydroelectric Facility – Monitoring Results**

5.1 *Access Road & Intake*

Construction Activities:

- Electrical work associated with commissioning inside the control room at BDRHEF Intake.

Environmental Summary:

- The construction phase of works at the BDRHEF Intake is complete. A small team of electricians continue to perform dry commissioning activities.
- As no plowing is allowed in UWR u-2-002 UL12 during the sensitive winter months BDRHEF Intake is accessed by Snowcat (Photo 20). The IEM conducted an audit on December 10, 2016 to verify that the road was clear of snow berms and other obstacles that would impede mountain goat movement within the UWR. The IEM conducted their audit at the same time as Snowline Safety to limit transport of vehicles throughout the winter range (Photo 21).
- The IEM did not observe any environmental issues associated with commissioning activities at the BDRHEF intake during this monitoring period.

Photos:



Photo 20 – Commissioning works at BDRHEF intake
(December 10, 2016).



Photo 21 – Current conditions of the BDRHEF intake access road
(December 10, 2016).

5.2 ***Downstream Tunnel Portal and Powerhouse***

Construction Activities:

- Foundation preparation for the steel tunnel liner installation.
- Flushing pipe installation and concrete works (Photo 22).
- Tunnel plug rebar, formwork and concrete works (Photo 23).
- Electrical work in the BDRHEF powerhouse (Photo 24).

Environmental Summary:

- CE conveyed all wastewater related to the BDRHEF tunnelling works to the downstream settling ponds for treatment throughout the monitoring period.
- CE commenced installation of a culvert that bisects the BDRHEF downstream tunnel spoil pile to convey water from an ephemeral drainage through the spoil area toward the Lillooet River FSR (Photo 25 - Photo 27). The temporary culvert will be used until flows in the ephemeral drainage are re-directed along the BDRHEF powerhouse access road and towards Boulder Creek according to the final design. These works were completed in the absence of flowing water, by pumping all seepage to the downstream settling ponds for infiltration to ground.
- The IEM did not observe any environmental issues during the monitoring period.

Photos:



Photo 22 – Installation of the flushing pipe into BDRHEF tunnel (December 12, 2016).



Photo 23 – Steel Liner and Tunnel Plug inside the BDRHEF tunnel portal (December 9, 2016).



Photo 24 –Electrical works inside the BDRHEF Powerhouse (December 12, 2016).



Photo 25 – Pump installed to capture seepage while installing the culvert at BDRHEF Spoil Pile (December 12, 2016).



Photo 26 – BDRHEF Spoil Pile culvert installation (December 12, 2016).



Photo 27 - BDRHEF Spoil Pile culvert installation (December 13, 2016).

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 IEM selected the regular monitoring 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 of an exceedance of in-situ WQ (turbidity and/or pH) because of 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, an asterisk (*) will be used to denote it.

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (µS)	Temp (°C)
Routine Water Quality						
December 7, 2016	-	BDR BG – Upstream of BDRHEF intake	Inaccessible; Construction works complete			
	-	BDR #1 – Downstream of BDRHEF intake	Inaccessible; Construction works complete			
	12:29	BDR #2 – Upstream of BDRHEF Powerhouse	7.9	1.0	91	0.0
	12:00	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	7.9	1.7	92	0.0
December 15, 2016	-	BDR BG – Upstream of BDRHEF intake	Inaccessible; Construction works complete			
	-	BDR #1 – Downstream of BDRHEF intake	Inaccessible; Construction works complete			
	13:15	BDR #2 – Upstream of BDRHEF Powerhouse	6.8	2.0	94	0.2
	13:05	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	6.7	6.6	89	0.2

5.4 *Recommendations*

IEM recommendations for the BDRHEF are as follows:

- CE should continue to direct all construction related wastewater to the settling ponds. CE should continue to monitor the settling/infiltration pond to ensure that it remains in good working condition, and perform all maintenance activities as outlined in the work plan. If water begins to discharge offsite, CE should conduct regular inspections to ensure that it meets BCWQGs prior to connection with the Boulder Creek side channel.
- As steel liners are removed from the laydown and installed into the BDRHEF downstream tunnel portal; observed hydrocarbon contaminated soils underneath the liners should be cleaned up and removed as required to prevent attracting wildlife (ULR#58).

5.5 *Upcoming Works*

New and/or environmentally sensitive construction activities scheduled to occur at the BDRHEF in January 2017:

- Electrical work associated with dry commissioning at the BDRHEF Intake.
- Electrical component installation will continue at the BDRHEF powerhouse.
- Manifold installation and concrete works will continue at the BDRHEF downstream tunnel portal.
- Steel liner installation will continue, and a low density concrete fill will be injected around the steel liner once installation is complete.

6.0 **Transmission Line – Monitoring Results**

6.1 *Transmission Line Construction Activities*

Construction Activities:

Segment 9

- Dismantling the stringer line along the Salmon Main access road.
- Access beyond the debris flow in stream 205a (CTF habitat) was done by hiking past the slide to complete fiber optic cable splicing.

Segment 12

- Splicing fiber throughout the segment.

Segment 14

- Splicing fiber throughout the segment.

Segment 16

- Splicing and stringing fiber throughout the segment.
- Closing jumpers at segment 383.

Environmental Summary:

- There were no works along the Transmission Line that required IEM environmental monitoring during this reporting period.

6.2 *Recommendations*

IEM recommendations for the Transmission Line are as follows:

- WEL's Environmental Manager continues to provide regular scheduling updates that permits the IEM to assess environmental risks and coordinate monitoring requirements. WEL should continue to provide the IEM with a minimum of 48 hours' notice if monitoring presence is required or expected for construction activities.

6.3 Upcoming Works

New and/or environmentally sensitive construction activities scheduled to occur along the Transmission Line alignment in January 2017:

Segment 9

- Removing equipment from the Salmon Main access road.

7.0 Wildlife Sightings

As per the CEMP, the IEM implemented a wildlife sightings record. Project Personnel are required to regularly update the record and it is mandatory for all personnel to report wildlife sightings including, but not limited to bears, cougars, mountain goats and deer. 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

The Owner, Contractors, and IEM team reported the following wildlife sightings in December 2016:

Upper Lillooet Hydro Project - Wildlife Observation Form					
Date	Time	Observer (Company)	Species or Description	Location	Comments
12/1/2016	14:30	ETV CRT employee	2 Moose	KM41.2	On the road and then went upslope
12/2/2016	9:45	Cindi McPherson	2 Bald Eagles	KM40	Flying over the river
12/4/2016	8:20	Sheena Wallace	2 Moose	KM44.7 (DSP)	Coming down the goat berm
12/7/2016	8:25	Bob (Runner)	Moose	KM12	

8.0 Mountain Goat Monitoring Program

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

- The BDRHEF intake access road is gated to restrict motorized public access to the UWR (UL-12).
- The IEM will continue to be onsite daily to monitor construction activities during the sensitive winter months. If the IEM determines that noise monitoring is necessary we will return to performing active noise level monitoring.

- 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. 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); and,
 - 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.
- All construction activities within Truckwash Creek mountain goat migration corridor are complete as of December 15, 2016 and there will be no loud construction noises occurring at the ULR Intake for the rest of the winter season. The mountain goat monitoring program for 2016 is now complete. SES will re-assess requirements for further monitoring next year when works resume.
- To mitigate potential impacts to mountain goats during the sensitive winter period, construction activities will cease if a mountain goat(s) is (are) observed moving towards the ULRHEF intake and/or if a mountain goat(s) is (are) observed within a 500m line of site of a construction activity. No mountain goats were observed within 500m line of sight of construction activities and no work stoppages were required during this monitoring period.

9.0 Environmental Issues Tracking Matrix (ITM)

9.1 Hydroelectric Facilities (ULRHEF & BDRHEF)

ITM Tracking Legend:		<div style="background-color: yellow; padding: 2px;">Work Item Open</div> <div style="background-color: green; padding: 2px;">Work Item Complete</div> <div style="background-color: lightblue; padding: 2px;">Issue Closed</div>						
Issue Tracking		Environmental Issue		Mitigation Measures				
ID No.	Status	Location	Issue Description	Action Taken/Recommended	Date of Identification	Targeted Date for Completion	Date Completed	
ULR#58	OPEN	All work areas	Conservation Officer and BCEAO Compliance and Enforcement Officer Inspection noted non-compliance with regard to wildlife attractant management.	1. Develop, implement and document internal waste and attractant management auditing tool. Tool will be available for use by the IEM and CE's EM Team. Records of inspections and noted non-compliances should be tracked internally with clean-up documented in each report. This tracking tool will be available to agencies upon request. This tool should be used similarly to the Spill Reporting tool currently being employed onsite.	July 6, 2016	July 9, 2016	July 8, 2016	
				2. Repair and adjust the electric fences and charged entrance mats at the construction camp (perimeter fence, camp kitchen fence, and waste compactor fence) and surrounding the septic field.			July 21, 2016	
				3. Install self-closing door hinges in all site lunchrooms and anywhere food is being stored temporarily (lunch rooms, kitchen storage area) OR adjust how food is transported, stored and consumed onsite to eliminate the possibility of food and food waste attractants onsite.			July 21, 2016	
				4. Perform maintenance to clean-up grease and liquid waste around and underneath the garbage compactor			July 21, 2016	
				5. Install berms surrounding parking areas that are lined with impermeable fabric in areas where tunneling equipment is parked. All leaks could be considered wildlife attractants; therefore all leaky equipment should be repaired and leaks or spills to ground in parking areas must be cleaned up daily and be disposed of in appropriate contaminated soil bins. Update December 8: CE continues to demobilize tunneling equipment, much of which remains parked within the lined parking area near the BDRHEF powerhouse. Steel tunnel liner has been stored over the area where leaks on the pad remain to be cleaned up. As the steel liners are moved, observed hydrocarbon contaminated soils should be cleaned up and removed as required				

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
				<i>to prevent attracting wildlife. This item remains open as hydrocarbon staining in the parking area near the BDRHEF powerhouses continue to be observed.</i>			
ULR#60	OPEN	Lillooet River FSR from 46 – 48 Km	The road fill slope of the Lillooet River FSR between KM46 – KM48 requires ESC measures to ensure slope stability and prevent rill erosion from transporting material into the forested area below.	1. <i>Assess the road fill slope conditions following conduit installation in the Lillooet River FSR in this section. Update September 30, 2016: CE and the IEM have assessed areas of concern and have discussed ESC stabilization/reclamation of the slopes by hydro-seeding with alder and hydro-mulch of appropriate strength (BFM) and at sufficient application rate.</i>	August 8, 2016	August 16, 2016	September 30, 2016
				2. <i>Provide and implement an agreed upon plan to protect the slope from an erosion and sediment transport perspective and/or a plan to initiate reclamation of the impacted area. Update December 8, 2016 – CE failed to address this concern and now snow and weather will prevent hydro-seeding from occurring this year. Repairs to road edge also remain outstanding and present as ESC risk once the spring melt begins. Any mobilization of side cast material during the spring melt will need to be re-assessed and the slopes repaired/stabilized prior to further erosion in the spring of 2017.</i>			
ULR #63	OPEN	Conduit alignment between the BDRHEF intake access road and BDRHEF powerhouse along TX Line ROW.	Drainage paths interrupted by conduit installation have resulted in significant erosion and does not conform to the work plan or design.	3. <i>The work plan and design of the power and tech cable conduit between the BDRHEF intake access road and the BDRHEF powerhouse called for the installation of swales at all ephemeral drainage paths. The work plan and design were not implemented resulting in substantial erosion along the conduit alignment and along two of the TX Line temporary access roads. An updated drainage plan should be prepared and installed to prevent further erosion. Update December 12: CE explained that they are currently in discussion with WEL to approve the ditch line as a permanent structure and will update the design for this area.</i>	November 10, 2016	November 17, 2016	

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	
ULR #64	OPEN	Penstock access road and riparian area on the left bank of Truckwash Creek	Organics, mineral soils, and snow were mixed during construction of an access path on the left bank of Truckwash Creek	1. Soils (organics and mineral soil) were mixed with snow and placed on an access path constructed to perform Truckwash Creek over-drain repairs. This material is placed on the permanent penstock access road and in the riparian area of Truckwash creek, which will need to be reclaimed in 2017. The mixed material (organics, soils, and snow) are to be removed upon completion of the penstock over-drain repair works, to eliminate the ESC risk.	December 1, 2016	Upon completion of Truckwash Creek over-drain repairs		
<i>(next ITM – BDR#28 & ULR#65)</i>								

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	
<i>No outstanding environmental issues (next ITM – Tx#3)</i>								