



Upper Lillooet Hydro Project

Weekly Environmental Monitoring Report #107

Reporting Period: November 6 – November 19, 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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		Date Prepared: June 21, 2017 Date Submitted: August 14, 2017

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
November 6 - 12, 2016	SE, MC, TH, AS	<p>Construction Camp, Laydown Areas and the Lillooet River FSR</p> <ul style="list-style-type: none"> • Road maintenance on the Lillooet River FSR • The Lillooet River breached its banks during a storm on November 8-9, 2016 causing flooding in Pemberton and along the Lillooet River FSR. Works were suspended according to rainfall shutdown guidelines overnight on November 8. Works resumed on November 10. • Installation of a pump at KM41 of the Lillooet River FSR to direct turbid water to vegetated area <p>ULRHEF Intake & Upstream Tunnel Portal</p> <ul style="list-style-type: none"> • BEBO tunnel backfill • Repair works on the Obermeyer weir <p>ULRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Access road drainage improvement, maintenance of the infiltration pit/sump • Demobilization of the water treatment system and CO₂ tank. <p>ULRHEF Penstock</p> <ul style="list-style-type: none"> • Welding and coating works • ASTR-03 riprap placement above HWM • Reclamation work involving organic soil and woody debris placement <p>ULRHEF Powerhouse</p> <ul style="list-style-type: none"> • Mechanical and electrical works inside powerhouse • Superstructure deficiency corrections • Switchyard works <p>BDRHEF Intake & Upstream Tunnel Portal</p> <ul style="list-style-type: none"> • Pulling rope and cables through buried conduit • Ditching and road grading • Demobilization of active water treatment system <p>BDRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Final lining and rock support (including shotcrete) • Rocktrap excavation, stabilization, followed by rebar and formworks <p>BDRHEF Powerhouse</p> <ul style="list-style-type: none"> • Bifurcation rebar and formwork • Electrical work inside powerhouse <p>TX Line</p> <p>Segment 13, 14 & 16</p> <ul style="list-style-type: none"> • Conductor stringing, tensioning and clipping <p>Segment 5</p> <ul style="list-style-type: none"> • Emergency works to repair pole structure 139 and flood damages along the Tx-line alignment
November 13 – 19, 2016	SE, AS, MC	<p>Construction Camp, Laydown Areas and the Lillooet River FSR</p> <ul style="list-style-type: none"> • Road maintenance on the Lillooet River FSR • Reclamation of KM49 diversion slope • Magazine log box culvert replacement planning and QP assessment of the area <p>ULRHEF Intake & Upstream Tunnel Portal</p> <ul style="list-style-type: none"> • Obermeyer repair works • Sediment pond reclamation • Intake road deactivation and removal of water treatment pipes • Soil sampling by a QP at electrical trailers at KM48.7

		<ul style="list-style-type: none"> • Sediment removal from between the large and fine trash racks • Trash rack and stop log concrete pour • Radar sensor installation <p>ULRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Backfill of the tunnel portal and demobilization from site • Decommissioning the oil water separator <p>ULRHEF Penstock</p> <ul style="list-style-type: none"> • Reclamation of the Truckwash Creek crossing <p>ULRHEF Powerhouse</p> <ul style="list-style-type: none"> • Andritz mechanical and electrical works • Superstructure deficiency corrections • Westpark switchyard works • Installation of pump and fish-screen to pump down tailrace • QP fish salvage in tailrace <p>BDRHEF Intake & Upstream Tunnel Portal</p> <ul style="list-style-type: none"> • Pulling rope and cables through buried conduit • Electrical works performed with hand tools at the intake control room • Demobilization of all construction equipment to KM3.0 of the intake access road • Reclamation of stock pile at KM2.5 <p>BDRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Rocktrap excavation, support and rebar and formwork • Tunnel plug grouting program <p>BDRHEF Powerhouse</p> <ul style="list-style-type: none"> • Andritz electrical work • Westpark switchyard works • Bifurcation rebar and formwork <p>TX Line</p> <p>Segment 1</p> <ul style="list-style-type: none"> • Mobilization to ULR Powerhouse <p>Segment 2</p> <ul style="list-style-type: none"> • Mobilization to BDR Powerhouse <p>Segment 5</p> <ul style="list-style-type: none"> • Emergency works to repair pole structure 139 and flood damages along the Tx-line alignment <p>Segment 13 & 14</p> <ul style="list-style-type: none"> • Conductor stringing, tensioning and clipping <p>Segment 16</p> <ul style="list-style-type: none"> • Conductor stringing, tensioning and clipping • Bucking felled timber
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IEM Team Personnel: TH – Tom Hicks; SE – Stephanie Ellis; MC – Mike Champion; AS – Anne Sutherland

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.
November 7	Memorandum and Conference call	INX, IEM, IE	INX presented a proposal to the IEM and IE requesting to complete minor electrical works at the BDRHEF intake post November 15. INX expected that additional days of electrical work would be required at the BDRHEF intake within UWR UL-12 post November 15, despite the accelerated pace schedule of the electrical contractor. All heavy civil and road works were expected to be complete prior to November 15. The IEM and IE requested further information regarding the scope and schedule works, as well as a QP evaluation of risks to mountain goats within UWR UL-12 posed by these works.	-
	Email	SES, INX	The IEM observed three pumice trucks and one pick up (associated with pumice mining operations), drive through the mountain goat migration corridor at Truckwash Creek during the morning shutdown period. This occurred at 07:00, no construction related traffic violated the shutdown.	-
November 8	Email	CE, SES, INX	CE informed all project related staff that as of 20h00 on November 8, more than 50mm of rain had fallen on the project site requiring the ULRHEF intake below 700m, BDRHEF intake below 772.2 m, and in the Truckwash Creek corridor are closed for a minimum of 24 hours.	-
November 9	Email	CE, SES, INX	CE informed all project related staff that as of 04h00 the project site had exceeded the rainfall threshold for extreme landslide risk, resulting in a general closure of all construction sites. CE will update staff when it is safe to return to work.	-
	Email	SES, INX	The IEM provided INX with a memo providing two options for repairing the flood damaged/ washed-out KM48 bridge on the Lillooet River FSR: <ol style="list-style-type: none"> 1. Replace the wood-box culvert with an appropriately sized temporary culvert to re-open the road this year, and install a permanent wood-box culvert during the next instream fish window (2017). 2. Realign the road to bypass both crossing structures. INX and CE would need to ensure that the bypass area is within the OLTC area and outside of Class 2 Critical Summer Grizzly Bear Forage Area Polygon (UL-GB04). 	-
November 10	Email	CE, SES, INX	CE provided the IEM and INX with the meeting minutes from the ULHP Bi-Weekly Environmental conference call that occurred on November 10, 2016.	-
	Email	WEL, INX, SES	WEL provided an update on impacts to the TX Line resulting from the November 8-9 flood event. The only major concern was the erosion of the foundations of structure 139 caused by North Creek flooding its banks. WEL indicated that emergency repairs to the structure	-

Date	Communication Type	Participants	Issues Discussed	ITM ID No.
			would be performed as soon as possible under IEM supervision. Further detail is provided in Section 6.1.	
	<i>Email</i>	INX, IEM, IE, CE	INX distributed the OLTC (L49717 amendment 10) and Section 8 Special Use Permit (S26115) authorizing construction of a new section of road to bypass the two wood box culverts at KM48 of the Lillooet River FSR that failed during the November 9 storm event.	-
	<i>Site meeting</i>	CE, SES	CE staff and the IEM met at Stream 9 (at the explosive magazine access road) to discuss the scope of works required to re-establish the access road following the November 9 flood event. A large amount of debris had blocked the bridge and diverted the stream to the east, causing significant erosion of the access road. Crews would need to either build a temporary bridge to access the debris jam, or conduct a wet crossing. The IEM did not agree that these works constituted emergency works, and noted that the works required to remove the debris was extensive and would involve instream work in a fish bearing watercourse outside of the least risk instream works window. Under current project permits the IEM did authorize the works to proceed without further discussion with INX and agencies.	-
November 12 - 15	<i>Email</i>	CE, SES	As promised, CE's environmental management team provided the IEM with daily pH readings taken from within the ULRHEF tunnel rock trap, during active injection grouting operations that occurred nightly from November 12 - 15. Reading were taken to confirm that injection grouting did not impact water quality in the rock trap, which discharged directly to Truckwash Creek via the flushing pipe. The pH levels measured were within BCWQGs during all grouting operation that occurred on night shift and outside of the daily mountain goat sunrise and sunset shutdown periods.	-
November 14	<i>Email</i>	INX, SES, CE	<p>INX requested that the IEM provide additional information on the works required to remove the debris blocking the Stream 9 bridge, realign the creek, and re-open the explosive magazine access road.</p> <p>The IEM noted that repairs at the bridge were extensive and would involve instream work in a fish bearing water course outside of the least risk instream works window. In the IEM's opinion, the works do not constitute an emergency, and that current permit conditions do not allow the work to proceed without seeking prior approval from MFLNRO.</p> <p>INX requested that CE provide more information regarding the scope of work required to re-establish the access road to the explosive magazine and develop a work plan.</p>	-
November 15	<i>Email</i>	SES, INX	The IEM requested that INX confirm that Andritz is aware of the mitigation measures required for working past the November 15 mountain goat closure at the BDRHEF intake. Additionally, they requested that Andritz provide an updated works schedule to ensure sufficient staffing.	-

Date	Communication Type	Participants	Issues Discussed	ITM ID No.
	<i>Email</i>	INX, IE, SES, MFLNRO	INX informed MFLNRO that the rain on snow event on November 8 and 9 caused significant damage to the explosive magazine access road and deposited a large amount of gravel and logs in the BDRHEF headpond and sluiceway. INX requested that Type 2 emergency instream works be completed to re-establish the access road to the explosive magazine and to remove the log jam within the BDRHEF sluiceway.	-
	<i>Phone calls, Memorandum, Email</i>	INX, SES, Andritz	<p>INX provided the IEM with a memo from their QP (Ecofish) outlining the scope and schedule of works, as well as an evaluation of risks to Mountain Goats within UWR UL-12. With the mitigation measures proposed, the QP concluded that minor electrical works could proceed and still meet the intent of the Mountain Goat Management Plan condition that restricts all construction activities at the BDRHEF intake from November 15 – April 30. Mitigation measures to be implemented during electrical works post November 15 include:</p> <ul style="list-style-type: none"> • Only hand power tools and a small generator can be used. • A maximum of a four-person crew can work at the intake, travelling to site in a single pick-up or snow-cat. No snow plowing of the access road is permitted. • Noise level monitoring will be performed by the IEM within 50 m from the work site; the threshold for acceptable noise levels will be highly conservative such that noise levels do not exceed ambient levels at 50m for the electrical works. • If noise generated by the works is above ambient levels, noise protection measures will be managed, in consultation with the IEM, so that they are no longer detectable. • The IEM will monitor mountain goat presence, if a goat is observed, within 500 m line of site from the works site, all activities will cease for at least 48 hours and will not resume without the IEM's approval. <p>INX confirmed that all the conditions listed in the memo would be respected, and the IEM confirmed that noise level monitoring and mountain goat monitoring would be performed during the remaining electrical works.</p>	-
November 14 - 15	<i>Email</i>	SES, INX, JEM	INX received verbal confirmation from MFLNRO that their request for Type 2 emergency works to remove woody debris from the BDRHEF sluiceway is approved, and the IEM confirmed they would be available to provide QP monitoring of the works. On November 15, the IEM noted that the INX operations crew had begun to remove some of the debris using hand tools (come-along and log grapple) on November 14, but the IEM was not given prior notification and therefore did not monitor works. The IEM monitored the removal of the remaining log jam on November 15 and no water quality concerns were noted and noise levels did not exceed ambient conditions.	-
November 15	<i>Email</i>	SES, CE, INX	CE completed road repairs along Boulder Intake Access Road around KM2.5 by placing rip rap to repair the ditch	-

Date	Communication Type	Participants	Issues Discussed	ITM ID No.
			damaged by the November 9 storm. Crews completed the work with flowing water in the ditch, and although the road drainage ditch did not discharge directly to a watercourse, best management practices were not followed. Works were halted until the area was isolated by pumping water around the work area, allowing works to continue in the dry.	
November 16	<i>Email</i>	INX, SES, MFLNRO, EAO, Lil'wat Nation	INX provided the IEM and MFLNRO with an incident report for violation of the sunset closure within the mountain goat migration corridor by INX operations crews. The report was distributed to the Lil'wat Nation and agencies.	EIR032
November 17 - 18	<i>Email</i>	CE, INX, SES, MFLNRO	INX provided CE and the IEM with MFLNRO approval for an instream work window exemption to complete the repairs on the Stream 9 bridge. Before works can commence, CE must provide an email work plan detailing construction steps, how they will adhere to the conditions of MFLNRO's approval, and a memo from their QP before works can commence. CE provided a brief work plan outlining the steps to complete the instream works.	-
November 18	<i>Site meeting and Email</i>	SES, CE	The IEM observed the release of a small quantity of "green liquid" used to seal the inflatable Obermeyer bladder (this liquid did not enter the Lillooet River). The IEM requested that CE provide the MSDS for this liquid, before cleaning or disposing of the leaked material. The liquid "Slime Inner Tube Sealant" and "Slime Pro Tubeless Sealant" are considered class 1 and 2 water level hazards. The IEM informed CE that this material is not to be discharged to surface waters or allowed to infiltrate into the ground water. Crews disposed of this liquid as outlined in the accident release prescriptions in the MSDS.	-
	<i>Pre-work Meeting</i>	CE, SES, INX	A pre-work meeting was held for the ULRHEF penstock flushing. All attending reviewed the work plan and discussed safety, environmental, and construction concerns.	-
	<i>Phone call, Memorandum, Email</i>	INX, CE, IEM, IE	The INX and CE provided the IEM and IE with a QP prepared memorandum discussing and evaluating the risks to mountain goats within UWR UL-12, posed by installing the BDRHEF intake gate heating system post November 15. The installation involved two days of work with the use of hand tools, and delivery of equipment to site with a loader. With the mitigation measures already in place (for the electrical works at the BDRHEF intake post November 15) it was determined that the works could proceed concurrently with the electrical works and continue to meet the intent of Mountain Goat Management Plan condition that restricts all construction activities at the BDRHEF intake from November 15 – April 30.	-
November 19	<i>Pre-work Meeting</i>	CE, SES, INX	A pre-work meeting was held for the installation of the radar sensor at KM49. All attending reviewed the work plan and discussed safety, environmental, and construction concerns.	-

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>The IEM was onsite to oversee daily construction equipment shutdowns (November 1 - 30) beginning one hour before and two hours after sunrise as well as two hours before and one hour after sunset.</p> <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.</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><u>NOTE:</u> BDRHEF intake electrical wiring works and installation of the intake gate heating system was evaluated by a QP and determined to be similar to operations type maintenance works and of low potential risk to mountain goats. These works were permitted to occur until November 23 (8 days beyond November 15) under the supervision of the IEM.</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	Segment 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 repaired the culvert at KM44 of the Lillooet River FSR following the November 9 flood event. (Photo 1 - Photo 2).
- Construction of a new section of road to the ULRHEF intake, bypassing the two failed culverts at KM48 of the Lillooet River FSR (Photo 3 - Photo 6).

Environmental Summary:

- The Lillooet River FSR was closed on the evening of November 8 through the morning of November 10 due to heavy rain fall that exceeded the extreme landslide risk criteria outlined in the Landslide Risk Management Plan, and due to several washouts that restricted access.
- During the heavy rains on November 8 and 9, the culvert at KM44 of the Lillooet River FSR became clogged with debris, forcing the stream to flow over the road. Crews began emergency works to remove the debris and repair the culvert on November 10. Crews began instream works to divert the stream into a nearby culvert before the IEM arrived on site. Once on site, the IEM monitored the removal of debris from the culvert invert and the re-establishment of the stream to its original channel (Photo 1). The IEM monitored water quality throughout the construction activities that they were present for. A sediment pulse (over-range on the turbidity meter) was observed after the creek was diverted into its original channel (Photo 2), but the pulse was short lived and water quality returned to within BCWQGs within two hours following the diversion of the watercourse into the original channel. Additional water quality results are available upon request.
- The November 8 and 9 heavy rains caused both woodbox culverts at KM48 of the Lillooet River FSR to fail, cutting off access to the ULRHEF intake (Photo 3 - Photo 4). CE, INX, the IEM, and Hedberg discussed options to restore access to the ULRHEF intake and agreed that creating a bypass road to the west of the creek; thereby eliminating the need to cross the two failed woodbox culverts (Photo 6), was the best option. Consultation with the Lil'wat Nation and MFLNRO was performed and approval was granted prior to proceeding with the access road re-alignment. On November 11, crews completed construction of the new section of access road to the ULRHEF intake. The IEM was present for the kick-off meeting and stressed that proper drainage must be installed as the road is constructed. The IEM monitored all construction activities and did not observe any environmental issues. On November 14, a professional forester (Hedberg) inspected the newly constructed road and informed CE of deficiencies that would need to be addressed for the final sign-off of the road, specifically that the grade (20%) needed to be reduced to 15 – 16%, the road needed to be widened to allow logging trucks to pass, and road blocks needed to be installed to prevent the public from accessing the two failed woodbox culverts.

Photos:



Photo 1 – Removal of debris blocking the invert of the KM44 culvert (November 10, 2016).



Photo 2 – Sediment pulse in ASTR-03 upon its diversion into its original channel post flood event (November 10, 2016).



Photo 3 – Upstream KM48 woodbox culvert completely failed (i.e. washed out) in the heavy rain on November 8 and 9 (November 12, 2016).



Photo 4 – Downstream KM48 woodbox culvert damaged in the November 8 and 9 heavy rains (November 11, 2016).

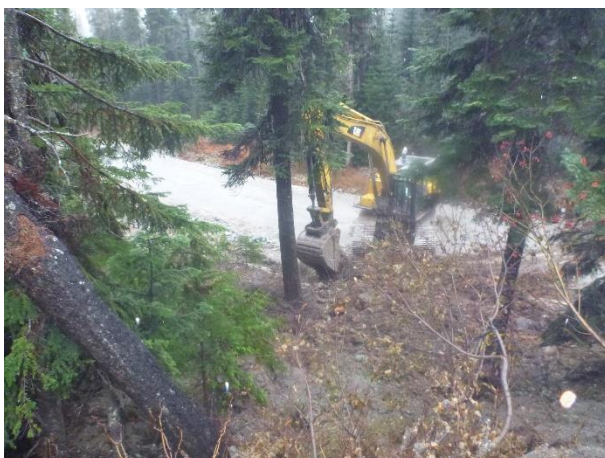


Photo 5 – Crews removing vegetation along the new ULRHEF intake access road alignment (November 11, 2016).



Photo 6 – Newly completed access to the ULRHEF intake (November 11, 2016).

4.2 *Intake, Concrete Arch Foundation Walls, and Upstream Tunnel*

Construction Activities:

- Backfill of the BEBO tunnel wall (Photo 7).
- Removal of debris and sediment from the intake structure deposited during heavy rains (Photo 8 - Photo 9).
- Obermeyer repair works (Photo 10).
- Excavation, re-contouring, and reclamation of the slope on river right of the intake (Photo 11).
- Removal the culvert from the temporary road used during construction of the diversion channel and Obermeyer weir (Photo 12 - Photo 13).
- Upstream tunnel settling pond reclamation (Photo 14).
- Temporary intake access road deactivation and reclamation.

Environmental Summary:

- All works at the ULRHEF intake were suspended from November 9 through November 11 due to the extreme risk of landslides, and the failure of two woodbox culvert failures at KM48 of the Lillooet River FSR, which cut off access.
- The November 8 and 9 heavy rains resulted in the Lillooet River flowing through both the ULRHEF sluiceway and the Obermeyer channel (Photo 8). Flows receded on November 14, allowing Ecofish to conduct a fish salvage within the Obermeyer channel. After the salvage (no fish captured), crews continued repair works on the Obermeyer structure (Photo 10).
- On November 15, CE removed the culvert from the temporary road used during construction of the diversion channel and Obermeyer weir. Crews pumped the stream around the culvert, isolating the work area, removed the culvert, and armoured the new channel with rip-rap (Photo 13). The IEM monitored all instream activities and measured water quality throughout the works. A pulse in turbidity occurred when the stream was directed through the newly constructed channel (max turbidity = 1896AU), however the pulse was short lived (<10 minutes) and water quality returned to within BCWQGs within one hour and fifteen minutes. Additional water quality results are available upon request.
- On November 18, crews spilled an unknown quantity of “Slime Inner Tube Sealant” and “Slime Pro Tubeless Sealant,” the two fluids used to seal the Obermeyer inflatable bladder (Photo 15 - Photo 16). The MSDS for these two liquids lists them as class 1 and 2 water level hazard. The IEM informed CE that the spilled liquid could not be discharged to surface water or allowed to infiltrate to ground water. CE was directed clean up and dispose of the liquid and any contaminated water as outlined in the accidental release procedures in the MSDS. CE used a vacuum truck to remove the spilled liquid and contaminated water from the diversion channel, and temporarily stored it at the KM38 mechanic lay down until it can be properly disposed of offsite.

Photos:



Photo 7 – Completed back fill of the BEBO tunnel wall (November 14, 2016).



Photo 8 – The Lillooet River flowing through both the sluiceway and the Obermeyer channel (November 11, 2016).



Photo 9 – Crews removing sand deposited behind the coarse trash rack (November 18, 2016).

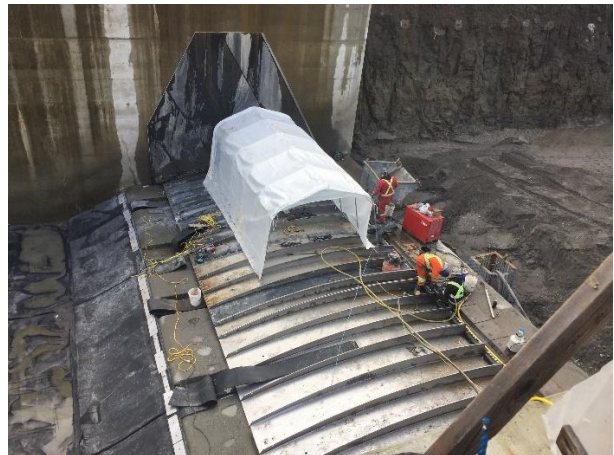


Photo 10 – Obermeyer repair works (November 16, 2016).



Photo 11 – Re-working the slope on river right of the intake (November 13, 2016).



Photo 12 – Pumping the stream around the work area prior to removing the culvert (November 15, 2016).



Photo 13 – Commissioning the newly constructed channel following culvert removal (November 15, 2016).



Photo 14 – Reclamation of the upstream tunnel settling ponds (November 18, 2016).



Photo 15 – Spilled sealant on the Obermeyer weir structure (November 18, 2016).



Photo 16 – Spilled sealant in ponds downstream of the Obermeyer structure (November 18, 2016).

4.3 *Downstream Tunnel Portal*

Construction Activities:

- Tunnel plug injection grouting was completed on night shift from November 12 – 15. All grout injection occurred outside of the mountain goat sunrise/sunset shutdown periods. No grout injection holes needed to be abandoned to accommodate the sunrise and sunset shutdown period and crew were able to complete the works ahead of schedule.
- Backfill of the downstream tunnel portal (Photo 17).
- Demobilization from the downstream tunnel portal work site, including decommissioning of the oil-water separator and drainage improvements.

Environmental Summary:

- Due to confined space safety constraints, the IEM did not conduct water quality sampling during the injecting grouting. To ensure water quality was protected during the works, the IEM worked with CE's environmental manager to train the crew to complete a pH sampling

program and deploy pH treatment in the event the injection grouting procedure forced grout into the rock trap; thereby affecting pH of water discharging through the flushing pipe. The pH was monitored in this way throughout the grout injection works. Results of the pH sampling were provide to the IEM the following morning and verified to be in compliance with BCWQGs. The grout injection program did not affect WQ in the rock trap, which remained within BCWQGs throughout the works.

- CE directed all tunnel seepage water through the ULRHEF tunnel flushing pipe into Truckwash Creek. The IEM monitored water quality and did not observe any exceedances of BCWQGs.

Photos:



Photo 17 – Crews backfilling the downstream tunnel portal (November 18, 2016).

4.4 ***Penstock and Truckwash Creek Penstock Crossing***

Construction Activities:

- ASTR-03 riprap placement (Photo 18).
- Reclamation of the penstock route.

Environmental Summary:

- The heavy rains on November 8 and 9, caused extensive flooding in Truckwash Creek. The high flows in the channel scoured a significant portion of the rip rap and geo-textile liner used to construct the penstock over-drain (Photo 19). CE is working with INX and the IEM to develop a workplan to repair the over-drain structure.
- CE installed rip rap on the right bank of ASTR-03 to the final design specifications (Photo 18). These activities did not require instream works, however, the IEM monitored all works and did not observe any environmental issues.

Photos:



Photo 18 – Completion of the rip rap on the right bank of ASTR-03 (November 6, 2016).



Photo 19 – Damage to the Truckwash Creek over-drain from the November 8 and 9 heavy rains (November 13, 2016).

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

Construction Activities:

- Andritz mechanical and electrical works in the ULRHEF powerhouse (Photo 20).
- CE continued to address deficiencies on the ULRHEF powerhouse superstructure.
- Westpark continued construction of the ULRHEF switchyard.
- QP salvage (Ecofish) of the ULRHEF tailrace (Photo 21 - Photo 22).

Environmental Summary:

- Heavy rains on November 8 and 9 resulted in the Lillooet River flooding the ULRHEF tailrace. The IEM and CE's environmental staff confirmed that all water within the tailrace met BCWQGs, and allowed crews to install two 6" pumps to dewater the flooded tailrace directly into the Lillooet River. A QP (Ecofish) conducted a fish salvage before the tailrace was fully dewatered (Photo 22), and CE crews resumed construction activities. No fish mortalities were reported to the IEM. Fish capture results will be submitted in accordance with Fish Collection Permit held by Ecofish.

Photos:



Photo 20 – Andritz mechanical works in the ULRHEF powerhouse (November 16, 2016).



Photo 21 – Dewatering the ULRHEF tailrace (November 12, 2016).



Photo 22 – Ecofish conducting a fish salvage in the ULRHEF tailrace (November 23, 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						
November 12, 2016	11:30	ULR Background – ULRHEF Intake	7.8	726AU	56	5.5
	12:14	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	7.7	729AU	64	4.4
	12:38	ULR # 1 – Upstream of ULRHEF Powerhouse	7.8	723AU	65	5.0
	12:50	ULR #2 – Downstream of ULRHEF Powerhouse between KM40.5 and KM41	7.8	721AU	65	4.9
	14:35	ULR #3 – Lillooet River FSR KM38 Laydown – D/S of Boulder confluence	7.6	735AU	56	5.7
	17:00	ULR #4 – Lillooet River FSR KM24 – D/S of all works and Meager confluence	8.0	740AU	65	6.6
November 18, 2016	16:29	ULR Background – ULRHEF Intake	7.2	26.0	99	3.5
	16:17	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	7.7	31.7	112	3.7
	11:20	ULR # 1 – Upstream of ULRHEF Powerhouse	7.9	29.3	109	3.6
	11:50	ULR #2 – Downstream of ULRHEF Powerhouse between KM40.5 and KM41	7.4	29.4	108	3.7
	15:29	ULR #3 – Lillooet River FSR KM38 Laydown – D/S of Boulder confluence	7.8	24.2	103	3.4
	17:30	ULR #4 – Lillooet River FSR KM24 – D/S of all works and Meager confluence	7.9	21.6	96	3.6

4.7 Recommendations

ITEM recommendations for the ULRHEF are as follows:

- CE should remove material deposited on the downslope of the Lillooet River FSR between KM46.5 – 48 and hydroseed exposed soils (ULR#60).
- CE should monitored the newly constructed ULRHEF intake access road to ensure all drainage features are functioning properly.
- CE should continue to remind crews of food and wildlife attractant management, as per the Human – Bear and Human – Wildlife Interaction Management Plans.
- CE should continue to install and maintain sediment and erosion mitigation measures to prevent the generation of sediment laden water.

4.8 Upcoming Works

New and/or environmentally sensitive construction activities scheduled to occur at the ULRHEF:

- Snow plowing on the Lillooet River FSR and access roads.
- Raising the elevation of the Lillooet River FSR from KM41.5 – 42.3.
- Reclamation of the PAG spoil pile at KM41.7.
- Obermeyer structure repair works.

- Deactivation of the ULRHEF intake access road.
- Truckwash Creek over-drain repairs.
- Construction of flood protection berms at ASTR – 03 and ASTR – 04.
- Penstock flushing.

5.0 Boulder Creek Hydroelectric Facility – Monitoring Results

5.1 Access Road & Intake

Construction Activities:

- CE completed all construction activities and seasonal road deactivation at the BDRHEF intake. All equipment was demobilized to KM3.5 of the Boulder intake access road.
- Pulling cables through the buried conduit.
- Andritz electrical works (Photo 23).
- Reclamation of the KM3.5 spoil pile.
- Removing debris from the BDRHEF headpond and sluice gate (Photo 24).

Environmental Summary:

- During the heavy rains on November 8 and 9, material (gravel and woody debris) infilled the portions of the BDRHEF headpond. Woody debris became lodged in the sluiceway preventing the gate from operating. INX requested and received a Type 2 emergency works authorization from MFLNRO to conduct instream works outside of the least risk fisheries window. Works began on November 14, without prior notification to the IEM and therefore no monitoring data is available for works completed on November 14. On November 15, the IEM monitored as crews used a come-a-long and grapple to dislodge the woody debris from the sluiceway, in the same manner as was completed the previous day. No water quality concerns were noted and noise levels did not exceed ambient conditions during the works on November 15.
- The IEM monitored the discharge from the active water treatment system for compliance with BCWQG. Water discharged to Boulder Creek did not exceed > 8 NTU above background turbidity during the reporting period. On November 13, CE decommissioned the active water treatment system and removed it from the BDRHEF intake.
- CE completed construction of the BDRHEF intake structure and seasonal road deactivation within 500m of UWR u-2-002 UL 12. All construction equipment was demobilized to KM3.5 of the BDRHEF intake access road on November 15.
- According to the Mountain Goat Management Plan, 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; however minor electrical works and installation of the intake gate heating system were not able to be completed prior to November 15. After numerous discussions between INX, the IEM and IE, and two QP prepared memorandums outlining the scope and schedule of works, as well as an evaluation of risks to Mountain Goats within UWR UL-12; the IEM

determined that minor works could proceed at the BDRHEF intake post November 15. This decision was largely based on a QP evaluation of the works which outlined that the works presented low potential risk to mountain goats; therefore, the intent of the condition restricting construction activities at the BDRHEF intake could be achieved with a prescribed list of mitigation measures in place. The following mitigation measures were implemented during electrical works and installation of the intake gate heating system at the BDRHEF intake from November 15 – 19:

- Only hand power tools and a small generator were used.
- A maximum of a four-person crew worked at the intake, travelling to site in a single pick-up. No snow plowing of the access road occurred or was required.
- Noise level monitoring was performed by the IEM within 50 m from the work site; noise levels did not exceed ambient levels at 50m from the electrical works.
- The IEM monitored for mountain goat presence within 500 m line of site from the works site, and no mountain goats were observed.
- Electrical works and installation of the intake gate heating system will occur until November 23 (a maximum of 8 days beyond November 15) under the supervision of the IEM.

Photos:



Photo 23 – Electrical works at the BDRHEF intake (November 19, 2016).



Photo 24 – Debris lodged on and in the BDRHEF sluice way (November 13, 2016).

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

Construction Activities:

- Final tunnel lining and rock support, including shotcrete (Photo 25).
- Rock trap excavation, formworks, rebar, and concrete works.
- Tunnel grouting for final plug installation.
- Bifurcation rebar, formwork, and concrete works (Photo 26).
- Andritz electrical works in the BDRHEF powerhouse.

Environmental Summary:

- CE conveyed all wastewater related to the BDRHEF tunnelling works to the downstream settling ponds for treatment throughout the monitoring period (Photo 27).

Photos:



Photo 25 – BDRHEF downstream tunnel portal (November 19, 2016).



Photo 26 – Concrete pour on the BDRHEF bifurcation (November 14, 2016).



Photo 27 – BDRHEF downstream tunnel settling ponds (November 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						
November 12, 2016	13:32	BDR BG – Upstream of BDRHEF intake	7.7	32.7	48	5.6
		BDR #1 – Downstream of BDRHEF intake	Inaccessible			
	14:10	BDR #2 – Upstream of BDRHEF Powerhouse	7.7	17.7	48	5.8
	14:35	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	7.7	19.3	48	5.8
November 18, 2016	10:00	BDR BG – Upstream of BDRHEF intake	7.9	2.0	85	1.9
		BDR #1 – Downstream of BDRHEF intake	Inaccessible			
	15:02	BDR #2 – Upstream of BDRHEF Powerhouse	7.4	3.6	84	2.9
	15:15	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	7.0	3.8	84	2.9

5.4 *Recommendations*

IEM recommendations for the BDRHEF are as follows:

- CE should continue to direct all construction related wastewater to downstream tunnel settling ponds. CE should continue to monitor the final 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 from the newly constructed channel, CE should conduct regular inspections to ensure that it meets BCWQG prior to infiltration near or connection to Boulder Creek.

5.5 *Upcoming Works*

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

- Andritz electrical works and installation of the intake gate heating system at the BDRHEF intake.
- Rock trap excavation, formwork, rebar, and concrete works in the downstream portion of the BDRHEF tunnel.
- Tunnel plug grouting.
- Andritz electrical works in the BDRHEF powerhouse.

6.0 Transmission Line – Monitoring Results

6.1 *Transmission Line Construction Activities*

Construction Activities:

Segment 1

- Mobilization of equipment to both the ULRHEF and BDRHEF powerhouses.

Segment 5

- Structure 139 repair and re-location following the November 9 flood event.
- Installation of flood protection (cross ditching) along the access road to structure 139.

Segment 13 & 14

- Stringing and tensioning lines from structures 319 – 344.

Segment 16

- Installing a pad and anchors at structure 390.
- Stringing and tensioning lines and pulling conductor from structures 396 – 398.
- Bucking felled timber around structures 392 – 394.

Environmental Summary:

- On November 9, flood waters from North Creek washed out the Lillooet River FSR at KM19 and eroded the base of transmission line structure 139 adjacent to the Lillooet River (Photo 28). Westpark crews began repairing the structure under emergency works (<5 m from the high-water mark; Photo 29) on November 12. The IEM was on site to monitor all construction activities within 15 m of the Lillooet River, and the installation of flood protection in front of each structure between the Lillooet River and the Lillooet River FSR. As works were within 500m of core moose winter range, the IEM monitored construction related noise and monitored the area for the presence of moose. No moose were observed and construction related noise was deemed by the IEM to be within an acceptable noise level threshold. Westpark did not require instream works to complete the repair and the IEM did not observe any environmental issues associated with these construction activities.

Photos:



Photo 28 – Erosion from the November 9 flood at structure 139 (November 13, 2016).



Photo 29 – Repairing structures damaged in the November 8 and 9 heavy rain event (November 13, 2016).

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 IEM 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:

Segment 1 – 5

- Hanging fiber-optic cable
- Clearing hazard trees

Segment 14

- Clearing hazard trees

Segment 16

- Hanging fiber-optic cable

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

8.0 Mountain Goat Monitoring Program

The mountain goat monitoring program resumed November 1, 2016. The following mitigation measures related to mountain goats were implemented during this monitoring period:

- The BDRHEF intake access road is gated and manned by CE staff to restrict motorized public access to the UWR (UL-12). The gate will continue to be manned by CE until completion of works at the intake.
- The IEM completed noise monitoring and monitored for mountain goats within 500m line of sight of electrical and minor mechanical equipment installation at the BDRHEF intake from November 16 – 19. Noise generated by hand tools and by vehicle travel supporting the works did not generate noise above ambient conditions, and no mountain goats were observed within 500m of construction activities. Minor electrical and mechanical equipment installation will continue until November 22 under the supervision of the IEM.
- IEM was onsite to audit daily construction equipment shutdowns (November 1 - 30) beginning one hour before and two hours after sunrise as well as two hours before and one hour after sunset.
- The IEM will continue to be onsite daily to monitor construction activities during the mountain goat migration period and 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.
- 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:		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#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 November 17: CE continues to demobilize tunneling equipment, which remains parked within the lined parking areas. Leaks on the pad continue to be observed and should be removed on a regular basis as required to prevent attracting			

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
				wildlife. This item remains open as hydrocarbon staining in the parking areas continue to be observed.			
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. 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.	August 8, 2016	August 16, 2016	September 30, 2016
				2. 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 October 27, 2016: A plan has been agreed upon, however the implementation remains outstanding. This issue has now been open for more than 2 months, and the window to successfully hydro-seed now closed.			
ULR#61	CLOSED	Access roads and general ESC measures	ESC improvements are required to ensure the site performs well during the imminent fall rain events, and to maintain adherence to conditions of the CEMP, Ditch Management Plan, Erosion Prevention and Sediment Control Plan, and Surface Water Quality Protection Plan	1. The IEM has prepared FAM13 which describes ESC and ditch management improvements, some of which have been in discussion since August 18, 2016. Individual items are outlined in FAM13, which was provided to the contractor on September 30.	September 30, 2016	October 7, 2016	
				a) Ditches and checks dams between KM48.5 and the Keyhole Bridge are in need of maintenance. CE should ensure these ditches are continuous, armored against erosion (appropriately spaced check dams/armor), and able to receive and convey runoff. Update: CE has installed pumps to temporarily divert sediment laden water to a vegetated area for infiltration until final road capping and drainage structures can be installed.			October 25, 2016
				b) The Lillooet River FSR drainage from KM47-48 must adequately convey runoff away from the stream at KM48. Update: CE has installed a pump to direct water away from the bridge deck and the fish bearing stream as a temporary measure to protect the			October 25, 2016

ITM Tracking Legend:		<div style="background-color: yellow; padding: 2px;"><i>Work Item Open</i></div> <div style="background-color: green; padding: 2px;"><i>Work Item Complete</i></div> <div style="background-color: lightblue; padding: 2px;"><i>Issue Closed</i></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
				<p><i>watercourse. A temporary culvert has also been placed in the FSR to collect water flowing down the road surface and direct it away from the fish bearing stream.</i></p>			
				<p><i>c) The temporary ULRHEF intake access road has no ditch installed and the upstream side of the laydown adjacent to the intake structure is likely to pool water or result in unmitigated runoff to the Lillooet River. Provide and implement a temporary drainage solution until this area is reclaimed. Cross ditches and berms have been installed to prevent turbid water from entering the Lillooet River,</i></p>			<i>October 21, 2016</i>
				<p><i>d) Ditching along the ULRHEF lower portal access road requires maintenance and the drainage pattern at the base of the road has changed since the installation of the Truckwash Creek penstock crossing. Provide temporary repairs to the ditch to ensure it can receive and convey road drainage and/or install final drainage (note: sediment laden water should not be directed to the UWR replacement area). Update: Water ponding in the work area has saturated the haul road; however sediment laden water is contained within the work area and is not flowing offsite. Final drainage solutions will be installed at a later date,</i></p>			<i>October 25, 2016</i>
				<p><i>e) The access road at ASTR-04 crossing pools road runoff and discharges sediment laden water to ASTR-04 during rain events. CE has indicated that they are aware of this concern and are working on developing and implementing a final solution for road drainage.</i></p>			<i>October 21, 2016</i>
				<p><i>f) The steep penstock access road leading down towards the powerhouse from PI-12 (~3+950) requires measures to protect the running surface. The IEM suggest implementing seasonal deactivation measures or installing a combination of cross ditching and ditch</i></p>			<i>October 21, 2016</i>

ITM Tracking Legend:		<i>Work Item Open</i>					
		<i>Work Item Complete</i>					
		<i>Issue Closed</i>					
Issue Tracking		Environmental Issue		Mitigation Measures			
ID No.	Status	Location	Issue Description	Action Taken/Recommended	Date of Identification	Targeted Date for Completion	Date Completed
				<p><i>line check dams to prevent transporting sediment laden water to the base of the slope.</i></p> <p><i>g) The ULRHEF powerhouse access road ditch is not continuous, specifically the section along the toe of the spoil area. Install the appropriate drainage solution. This ditch is not yet installed, however ESC has not yet been a concern in this area</i></p> <p><i>h) The BDRHEF intake access road requires ditch maintenance, especially where ditches have been impacted by conduit installation. The access road also requires repair/grading where wheel ruts have resulted in water channelizing along the road alignment.</i></p> <p><i>Update November 14: CE has completed ditch line improvements, road grading, and seasonal road de-activation.</i></p>			<p><i>October 25, 2016</i></p> <p><i>November 14, 2016</i></p>
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.	<p>1. 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.</p>	November 10, 2016	November 17, 2016	

(next ITM – BDR#28 & ULR#64)

9.2 Transmission Line









ITM Tracking Legend:		<i>Work Item Open</i>						
		<i>Work Item Complete</i>						
		<i>Issue Closed</i>						
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>								

Environmental Incident Reporting Form

General Information	
Project Name: Upper Lillooet Hydro Project	Project Component: Migration Corridor on the FSR @ 44 km
Time/Date of Incident Start: 2016-11-15 around 14h30	Time/Date Incident Stopped: 2016-11-15 around 14h32
Date of Report: 2016-11-16	Project Incident Report Number: 2016-11-15 CE-EIR-032
Report Prepared By: Wayne Russell	
Contractors Environmental Manager: n/a	
Independent Environmental Monitor: Tom Hicks	
Licensee's Environmental Manager: Julia Mancinelli	

Contact Information for Company Involved in Incident	
Company: Innergex Renewable Energy Inc.	Address: 200 – 666 Burrard Street, Vancouver, BC V6C 2X8
Phone #: 604-633-9990	Email: JMancinelli@innergex.com
Contact Person: Wayne Russel	Position: Operations Director

Incident Type (check all that apply)			
Encroachment of an Environmentally Sensitive Area (e.g. Riparian/Wildlife Buffer) Please provide details in "Description" section below.	<input type="checkbox"/>	Adverse Impacts to Fish/Wildlife (e.g. Mortality/Injury) Please provide details in "Description" section below.	<input type="checkbox"/>
Water Quality/Quantity Please provide details in "Description" section below.	<input type="checkbox"/>	Hazardous Material Spills (to ground or water) Please provide details in description section in regards to: <ul style="list-style-type: none"> Perceives extent of damage Type, quantity and area of the spill Containment Procedures Environmental features in close proximity to the spill 	<input type="checkbox"/>
Disturbance of known or unknown archeological /heritage site Please provide details in "Description" section below.	<input type="checkbox"/>	Air Quality Please provide details in "Description" section below.	<input type="checkbox"/>
Spill reported to external agencies If yes, describe the receiving environment and substance/quantity spilled.	<input type="checkbox"/>	Other Please provide details in "Description" section below.	<input checked="" type="checkbox"/>

Incident Profile									
Weather at time of incident	 <input type="checkbox"/> Clear	 <input checked="" type="checkbox"/> Partly Cloudy/ Variable	 <input type="checkbox"/> Cloudy	 <input type="checkbox"/> Showers/ Periods of Rain	 <input type="checkbox"/> Rain	 <input type="checkbox"/> Heavy Rain (>25mm in 24hr)	 <input type="checkbox"/> Storm (Heavy rain and high winds)	 <input type="checkbox"/> Snow	
Specific Location: FSR @ 44 - 48 km									
Description and Cause of Incident: <u>Description:</u> 1 pick-ups traveled through the mountain goat migration corridor during the sunset shutdown hours (i.e. 14:26 to 17:26). <u>Cause:</u> During the day (i.e. prior to the restriction), the operations crew travelled down to the Truckwash Creek area (which is within the 200m goat migration corridor) to assess the post-flood impacts on the penstock. However, during their assessment they lost track of time. The crew left the area (and migration corridor) and past the goat gate at 14:32 when the closure was in effect at 14:26. No goats were observed within the crews line-of-sight when they were at the penstock and/or traveling out of the corridor.									
Incident Witness: Anne Sutherland, Goat Monitor for SES									
Were there any Potential Environmental impacts as a result of the incident? (e.g., surface contamination, storm sewers, or fish/wildlife mortalities)							Yes <input type="checkbox"/>	None Observed <input checked="" type="checkbox"/>	
If Yes, please describe:									
Has Wildlife Salvage Protocol been followed?							Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
If No, please explain:									
Water Quality Samples Collected?							Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
If yes, attach results of water quality analysis to report in table format. Include Laboratory analysis if completed. If No please explain:									
Have applicable photos and/or drawings been attached to the incident report?							Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
Incident Response Measures / Actions to Prevent Incident Recurrence									
<ol style="list-style-type: none"> 1. Project crew leads and key staff were provided an advisory of the ULHP Month of November Daily Operational Shutdowns Sunrise/Sunset on October 27, 2016, including a calendar of shutdown times. 2. The 3 workers driving in the pick-up have been reminded of the importance of respecting the daily shutdowns and the importance of planning their activities around the shutdowns. 3. Hard copies of the daily operational shutdowns will be placed in each of their trucks to have readily available to check. 4. Gate attendants were in place on either end of the mountain goat corridor for the sunset restriction; however, the crew was already in the area before the restriction came into effect. 									

Notification Record						
Agency Reported to	Contact Information	Agency Contacted		Date and Time Reported	Reported By	Method of Reporting
		Yes	No			
External						
MFLNRO	James Davies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	November 16, 2016	Julia Mancinelli	Email within 48 hours of the EIR being finalized.
BCEAO	Monica Perry Sheldon Foote Justin Carlson	<input checked="" type="checkbox"/>	<input type="checkbox"/>	November 16, 2016	Julia Mancinelli	Email within 48 hours of the EIR being finalized.
Lil'wat Nation	Harriet VanWart Carrie Lester	<input checked="" type="checkbox"/>	<input type="checkbox"/>	November 16, 2016	Julia Mancinelli	Email within 48 hours of the EIR being finalized.
PEP	1-800-663-3456	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
MOE Staff		<input type="checkbox"/>	<input checked="" type="checkbox"/>			
DFO Observe, Report and Record Line	1-800-465-4336	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
DFO Representative	Brain Naito	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
RAPP Line	Conservation Officer Services 1-877-952-4336	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Environment Canada	604-666-6100	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Canadian Coast Guard	604-666-6011	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Local Fire Rescue	911	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Internal						
IEM	Tom Hicks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2016-11-15 6:00 PM 2016-11-16 11:56 am		IEM Phoned; Emailed INE
IE	Jennifer McCash	<input checked="" type="checkbox"/>	<input type="checkbox"/>	November 16, 2016	Julia Mancinelli	Email
		<input type="checkbox"/>	<input type="checkbox"/>			
		<input type="checkbox"/>	<input type="checkbox"/>			
		<input type="checkbox"/>	<input type="checkbox"/>			

Independent Environmental Monitor:

Tom Hicks

Lead Field IEM – Sartori Environmental
Services



November
16, 2016

Print Name

Position and Company

Signature

Date

Innergex Operations Manager:

Wayne Russel

Operations Director - Innergex



November
16, 2016

Print Name

Position and Company

Signature

Date