



Upper Lillooet Hydro Project

Weekly Environmental Monitoring Report #102

Reporting Period: August 28 – September 10, 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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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)
 Occupant Licence to Cut (BDRHEF – KM 38 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)

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
August 28 – September 3, 2016	SE, MC, TH	<p>Construction Camp, Laydown Areas and the Lillooet River FSR</p> <ul style="list-style-type: none"> • Road maintenance on the Lillooet River FSR (ditching from KM44.7 – 45.5) • Conduit installation from KM46 – 49 • Continued dust suppression <p>ULRHEF Intake & Upstream Tunnel</p> <ul style="list-style-type: none"> • Drilling for rock face stabilization, anchor installation and shotcrete of rock face below the control room building (left bank downstream of the sluice way) • Removal of downstream cofferdam – built pad for rock face stabilisation • Upstream tunnel portal stripping of ventilation; purge, final lining and rock support <p>ULRHEF Downstream Tunnel</p> <ul style="list-style-type: none"> • Final lining and rock support (including shotcrete) • Slab pour during nightshift • Sediment removal from the Stormtec water treatment system <p>ULRHEF Penstock</p> <ul style="list-style-type: none"> • Backfill and compaction • Reclamation along penstock • Riprap placement and berm erection at Truckwash creek for overdrain construction • Truckwash creek diversion into new channel <p>ULRHEF Powerhouse & Tailrace</p> <ul style="list-style-type: none"> • Andritz mechanical and electrical works • Second stage rebar, formwork and concrete works • Tailrace instream works –Riprap placement • Deficiency correction of powerhouse access road • Westpark Switchyard works • Recontouring of spoil pile at KM41.2 <p>BDRHEF Intake & Upstream Tunnel Portal</p> <ul style="list-style-type: none"> • Rebar, formwork and concrete works • Coanda and Intake gate installation (Carbonneau) <p>BDRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Drilling, blasting and tunnel stabilization • Tunnel Breakthrough (August 29th) • Ventilation duct removal and stabilization • Final lining and rock support (including shotcrete) <p>BDRHEF Powerhouse & Tailrace</p> <ul style="list-style-type: none"> • Andritz electrical work • Bifurcation excavation • Switchyard concrete works <p>TX-Line</p> <p>Segment 6</p> <ul style="list-style-type: none"> • Structure 140 reinforcement (bin wall installation) <p>Segment 11, 12 & 13</p> <ul style="list-style-type: none"> • Pole framing <p>Segment 14</p> <ul style="list-style-type: none"> • Machine and hand ground preparation

Date	IEM Team Personnel	Key Monitoring Locations & Activities
		Segment 16 <ul style="list-style-type: none"> • Clearing ROW and construction of the Canadian National (CN) Railway crossing
September 4 – 10, 2016	SE, MC, TH	<p>Construction Camp, Laydown Areas and the Lillooet River FSR</p> <ul style="list-style-type: none"> • Road maintenance on the Lillooet River FSR • Ditching and windrow removal along the FSR • Silt fence installation around watercourses <p>ULRHEF Intake & Upstream Tunnel</p> <ul style="list-style-type: none"> • Final lining and rock support (including shotcrete) • Downstream cofferdam removal (all works completed above the high water mark) • Sluice gate and IFR gate crack injection • Upstream cofferdam removal (in the dry) <p>ULRHEF Downstream Tunnel</p> <ul style="list-style-type: none"> • Rock trap drill, blast, and rock support (including shotcrete) • Demobilization of secondary Stormtec water treatment system <p>ULRHEF Penstock</p> <ul style="list-style-type: none"> • Construction of berm next to Truckwash creek • Reclamation along penstock alignment • Backfill and reshaping of slopes at Truckwash Creek <p>ULRHEF Powerhouse & Tailrace</p> <ul style="list-style-type: none"> • Andritz mechanical and electrical works • Second stage rebar, formwork and concrete works • Westpark Switchyard works • Reclamation of spoil pile at KM41.2 <p>BDRHEF Intake & Upstream Tunnel Portal</p> <ul style="list-style-type: none"> • Rebar, formwork and concrete works • Cleanup at the intake • Installation of a new discharge outlet for the water treatment system • Stripping formwork from wing wall • Spill way (downstream of the Coanda) placement of lock blocks • Coanda Installation (Carbonneau) <p>BDRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Final lining and rock support (including shotcrete) <p>BDRHEF Powerhouse & Tailrace</p> <ul style="list-style-type: none"> • Andritz electrical work • Bifurcation excavation • Switchyard concrete works <p>TX-Line</p> <p>Segment 6</p> <ul style="list-style-type: none"> • Structure reinforcement and demobilization <p>Segment 11</p> <ul style="list-style-type: none"> • Pole framing <p>Segment 12</p> <ul style="list-style-type: none"> • Pole framing and setting with helicopters <p>Segment 13</p> <ul style="list-style-type: none"> • Dressing poles • Pole framing and setting with helicopters • Slashing and bucking timber <p>Segment 14</p> <ul style="list-style-type: none"> • Machine and hand ground preparation (including blasting) • Pole framing and setting with helicopters <p>Segment 15</p>

Date	IEM Team Personnel	Key Monitoring Locations & Activities
		<ul style="list-style-type: none"> • Pole framing and setting with helicopters Segment 16 • Clearing ROW and construction the Canadian National Railway crossing • Yarding and bucking timber

IEM Team Personnel: TH – Tom Hicks; SS – Stephen Sims; SE – Stephanie Ellis; MC – Mike Champion

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.
August 30	<i>Site inspection</i>	SES, JEM, INX, CE	The IE conducted the monthly site inspection with the IEM, INX and CE representatives.	-
September 1	<i>Email</i>	SES, CRT, INX, MFLNRO, BCCOS	RE: Upper Lillooet Hydro Project – Bear Sighting (August 31, 2016) – The IEM informed MFLNRO and the BCCOS that CRT observed a grizzly bear with two sub-adults at KM45.5 of the Lillooet River FSR on August 31, 2016.	-
	<i>Pre-Work Meeting</i>	CE, SES, INX	CE held a pre-work meeting for the construction of the rock trap in the ULRHEF lower-tunnel portal. All attending reviewed the work plan and discussed safety, environmental, and construction concerns.	-
	<i>Email, Teleconference</i>	CE, INX, SES	The bi-weekly environmental coordination meeting was held and the meeting minutes were distributed by CE.	-
September 2	<i>Email</i>	WEL, SES, INX	WEL submitted a summary of the 2016 AMBNS effort and results, indicating that no nests were discovered during two separate intensive 1-day surveys completed prior to clearing areas of less than 1/3 ha.	-
September 3	<i>Email</i>	INX, SES, CRT	RE: ULHP 2016-09-01 – Letter – ULHP (INC-CRTEBC-067) EAO Inspection Report – INX provided CRT and the IEM with the EAO inspection report in regards to the June/July 2016 EAO site inspection.	<i>ULR #58</i>
September 8	<i>Email</i>	WEL, SES, INX	RE: Monitoring request – bucking near structure 316 – WEL notified the IEM that crews would be working near a stream (which is currently not flowing) and requested that the IEM monitor the works. The IEM notified WEL that works could proceed without the IEM being present to monitor the works.	-
September 9	<i>Email</i>	INX, WEL, SES	RE: ULHP EAO C&E Final Inspection Report from June/July 2016 – INX forwarded WEL’s email closing out all issues addressed in the EA inspection report for the transmission line.	-
	<i>Pre-Work Meeting</i>	CE, SES, INX	CE held a pre-work meeting for the installation of the permanent drainage at KM41.2 of the Lillooet River FSR. All attending reviewed the work plan and discussed safety, environmental, and construction concerns. The IEM will be on site to monitor the construction activities.	-

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
All Project Areas	TX Line, ULRHEF, & BDRHEF	Active Migratory Bird Nesting Period	AMBNS must occur prior to clearing vegetation in all Project areas according to the survey schedule and methods outlined in the Project's Active Migratory Bird Nest Survey Plan during the nesting period (May 1 – July 31). All nests identified as active must be protected by a no disturbance buffer until the nest is no longer deemed to be active by a QP (buffer distances vary by species and location; further details are provided in the AMBNS Plan).
	ULRHEF intake & tailrace, BDRHEF tailrace, and fish accessible tributaries of the Lillooet River	Reduced Risk Project Specific Instream work windows for the protection of Bull Trout, Cutthroat Trout and Pacific Salmon (Coho, Sockeye), during sensitive life stages	All instream work will be conducted within Project specific timing windows. They are as follows: ULRHEF intake: August 1 – October 31 ULRHEF and BDRHEF powerhouses: July 15 – September 15
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	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.
TX Line	Segments 8 - 16	Mountain Goat UWRs SO-04 & SO-08	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.
		Suitable Class 1 & 2 Grizzly Bear forage habitat	IEM monitoring is required when clearing within identified Class 1 & 2 Grizzly Bear forage habitat, to ensure clearing areas are minimized.
		Riparian Vegetation Management Areas (RVMA)	IEM monitoring is required during clearing within RVMAs.
		Ryan River Drainage	Construction of the TX Line into and across the Ryan River drainage will occur during the less critical Grizzly Bear summer foraging period (June 1 – September 1).
		Within 150m of wetlands or 100m of Coastal Tailed Frog Streams	IEM presence is required when clearing within 150m of wetlands or 100m of CTF Streams, to ensure clearing areas are minimized.

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 apply water to the Lillooet River FSR and construction access roads to minimize fugitive dust production throughout the reporting period.
- CE performed routine ditch maintenance (Photo 1) and silt fence repair/installation (Photo 2) along the Lillooet River FSR during this monitoring period.
- CE installed the permanent drainage at KM41.2 of the Lillooet River FSR (Photo 3 - Photo 4).

Environmental Summary:

- During night shift on September 9-10, CE replaced the collapsed box culvert at KM41.2, on the Lillooet River FSR, with three 1600mm corrugated steel pipes (CSP). The KM41.2 stream is a fish bearing watercourse, however it is an ephemeral drainage. CE completed all construction activities while the channel was dry and above the high-water mark of the Lillooet River (Photo 3 - Photo 4). The IEM monitored the culvert replacement and did not observe any environmental issues.

Photos:



Photo 1 – Ditch maintenance at KM46 of the Lillooet River FSR (August 29, 2016).



Photo 2 – Silt fence replacement at KM48 of the Lillooet River FSR (September 6, 2016).



Photo 3 – Excavation for the replacement of the KM41.2 stream crossing (September 10, 2016).



Photo 4 – Installation of the new 1600mm CSP for the KM41.2 stream crossing (September 10, 2016).

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

Construction Activities:

- Shotcrete application to the rock face below the ULR Intake control building (Photo 5).
- Removal of ULRHEF intake lower cofferdam (Photo 6).
- Installation the ULRHEF intake sluice gate (Photo 7).
- CE removed the ULRHEF intake upstream cofferdam during this monitoring period, in the dry (Photo 8).
- CE continued with the final lining and demobilization in the upper tunnel portal.

Environmental Summary:

- On September 3, CE applied shotcrete to stabilize the rock face below the ULRHEF intake control room building (Photo 5). The IEM monitored this activity and did not observe any environmental issues.
- On September 6, CE removed the ULRHEF intake downstream coffer dam (Photo 6). The removal did not require instream activities, as river levels were low isolating the downstream cofferdam. The IEM monitored construction activities and did not observe any environmental issues. Water quality was not monitored because construction activities did not impact the Lillooet River.
- On September 8, CE removed a portion of the ULRHEF upstream cofferdam above the high water mark (Photo 8). The IEM monitored the excavation, and did not observe any material enter the Lillooet River.

Photos:



Photo 5 – Shotcrete application to stabilize the rock face below the ULRHEF intake control room (September 3, 2016).



Photo 6 – Removal of the ULRHEF downstream cofferdam (September 6, 2016).



Photo 7 – Installation of the ULRHEF sluice gate (September 7, 2016).



Photo 8 – Removal of a portion of the ULRHEF upstream cofferdam, in the dry (September 8, 2016).

4.3 Downstream Tunnel Portal

Construction Activities:

- Final lining, floor slab pours, and rock stabilization of the ULRHEF tunnel occurred throughout the monitoring period (Photo 9).
- Drill, blast, and rock support (including shotcrete) for the ULRHEF lower-tunnel rock trap.
- CE continued regular maintenance on the active water treatment system throughout the monitoring period, including the removal of deposited sediments (Photo 10).

Environmental Summary:

- The IEM monitored the discharge from the active water treatment system for compliance with BCWQG. Water discharged to ASTR-03 did not exceed > 8 NTU above background turbidity during the reporting period. Additional water quality sampling results are available upon request.

Photos:



Photo 9 – Lower-tunnel portal (September 06, 2016).



Photo 10 – Removal of deposited sediment from the Truckwash Creek active water treatment system (August 29, 2016).

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

Construction Activities:

- Reclamation activities continued along the penstock right of way throughout this monitoring period (Photo 11).
- CE completed the penstock crossing at Truckwash Creek, diverted the creek into the newly constructed over drain, removed the steel diversion pipes, and began the Mountain goat specific reclamation and landscape restoration-on both banks of Truckwash Creek (Photo 12 - Photo 14).

Environmental Summary:

- On September 2, CE diverted Truckwash Creek into the newly constructed channel over the ULRHEF penstock (Photo 12 - Photo 13). The IEM monitored all instream activities, and collected water quality samples at ten minute intervals throughout the work. Elevated turbidity, associated with diversion activities, occurred for approximately three hours after the diversion of the creek into the newly constructed channel. Additional water quality sampling results are available upon request.

Photos:



Photo 11 - Reclamation of the penstock right-of-way east of Truckwash Creek (September 1, 2016).



Photo 12 - Diverting Truckwash Creek into the newly constructed penstock over drain (September 2, 2016).



Photo 13 - Truckwash Creek fully diverted into the newly constructed channel (September 2, 2016).



Photo 14 – Reclamation and landscape restoration on the west side of Truckwash Creek (September 7, 2016).

4.5 Powerhouse, Tailrace & Access Road

Construction Activities:

- Maintenance on the ULRHEF powerhouse access road (Photo 15).
- Andritz mechanical works in the ULRHEF powerhouse (Photo 16).
- Reclamation of the ULRHEF powerhouse spoil pile (Photo 17).
- Second stage rebar and concrete works in the ULRHEF powerhouse.
- Westpark switchyard works (Photo 18).

Environmental Summary:

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

Photos:



Photo 15 – Maintenance on the ULRHEF powerhouse access road (August 28, 2016).



Photo 16 – Andritz mechanical works in the ULRHEF powerhouse (August 30, 2016).



Photo 17 – Reclamation of ULRHEF powerhouse spoil (September 8, 2016).



Photo 18 – Westpark construction of the switchyard at the ULRHEF powerhouse (August 31, 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						
August 31, 2016	15:24	ULR Background – ULRHEF Intake	7.5	75.6	37	8.5
	15:10	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	7.8	74.3	38	8.6
	14:38	ULR # 1 – Upstream of ULRHEF Powerhouse	7.8	71.4	54	8.5
	11:39	ULR #2 – Downstream of ULRHEF Powerhouse between KM40.5 and KM41	7.6	67.3	61	6.6
	17:16	ULR #3 – Lillooet River FSR KM38 Laydown – D/S of Boulder confluence	7.4	62.5	64	9.8
	10:30	ULR #4 – Lillooet River FSR KM24 – D/S of all works and Meager confluence	7.4	68.3	77	10.2
September 5, 2016	8:32	ULR Background – ULRHEF Intake	7.89	38.0	59.5	6.4
	8:42	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	7.90	43.2	51.3	5.8
	9:34	ULR # 1 – Upstream of ULRHEF Powerhouse	8.07	47.3*	52.1	6.1
	9:45	ULR #2 – Downstream of ULRHEF Powerhouse between KM40.5 and KM41	8.09	43.6	53.6	6.4
	14:38	ULR #3 – Lillooet River FSR KM38 Laydown – D/S of Boulder confluence	8.18	36.8	61.1	7.9
	18:15	ULR #4 – Lillooet River FSR KM24 – D/S of all works and Meager confluence	8.25	31.5	65.3	9.5

4.7 Recommendations

IEM recommendations for the ULRHEF are as follows:

- CE should continue to convey all water from the ULRHEF upstream tunnel heading to the sediment basins for treatment. CE should perform regular monitoring to ensure that the water treatment system is functioning as intended and that discharge to the Lillooet River continues to meet BCWQGs.
- CE should remove material deposited on the downslope of the Lillooet River FSR between KM46.5 – 48 and hydroseed exposed areas to prevent erosion during fall rains (*ULR#60*).

- CE should perform regular inspections at all parking areas and ensure all spilled fuel and/or oil is cleaned up and disposed of in the proper disposal container, as per the Human-Bear Conflict Management Plan, and Hazardous Materials Management Plan.
- CE should continue to remind crews of proper food and wildlife attractant management, as per the Human – Bear and Human – Wildlife Interaction Management Plans.

4.8 *Upcoming Works*

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

- Final lining, rock support and concrete floor slab of the ULRHEF tunnel.
- Drilling, blasting, and concrete works will continue on the rock trap in the ULRHEF lower-tunnel portal.
- Removal of the ULRHEF cofferdam and diversion of the Lillooet River into the sluiceway.
- Generator installation in the ULRHEF powerhouse.
- Use of the ULRHEF intake sediment basins will continue.
- Westpark to continue construction of the ULRHEF switchyard.
- Backfill and contouring of the penstock crossing at Truckwash Creek.
- Continue reclamation of penstock spoil sites.
- Resume work on the ULRHEF BEBO tunnel structure.

5.0 Boulder Creek Hydroelectric Facility – Monitoring Results

5.1 *Access Road & Intake*

Construction Activities:

- Formwork, rebar, and concrete works continued on the intake and sluiceway structures (Photo 19).
- Installation of the Coanda screen and intake gate at BDRHEF intake (Photo 20).

Environmental Summary:

- The IEM did not observe any environmental issues associated with construction activities at the BDRHEF intake during this monitoring period.
- 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. Additional water quality sampling results are available upon request.

Photos:



Photo 19 – BDRHEF intake (September 4, 2016).



Photo 20 – Installation of BDRHEF Coanda screen (August 28, 2016).

5.2 *Downstream Tunnel Portal and Powerhouse*

Construction Activities:

- Breakthrough of the downstream tunnel with BDRHEF intake occurred on August 29 (Photo 21 - Photo 22).
- Removal of ventilation duck from BDRHEF tunnel.
- Final lining and rock stabilization of the BDRHEF tunnel.
- Andritz electrical work in the BDRHEF powerhouse (Photo 23).
- Excavation of the bifurcation at the BDRHEF powerhouse.
- BDRHEF switchyard installation.

Environmental Summary:

- CE conveyed all wastewater related to the BDRHEF tunnelling works to the downstream settling ponds throughout the monitoring period.
- The IEM did not observe any environmental issues during the monitoring period.

Photos:



Photo 21 – BDRHEF lower-tunnel portal (August 29, 2016).



Photo 22 – BDRHEF tunnel breakthrough at the intake structure (August 29, 2016).



Photo 23 – BDRHEF powerhouse and tailrace (September 2, 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						
August 31, 2016	16:20	BDR BG – Upstream of BDRHEF intake	7.4	40.7	61	9.5
	13:33	BDR #1 – Downstream of BDRHEF intake	7.6	32.5	59	8.7
	11:58	BDR #2 – Upstream of BDRHEF Powerhouse	7.4	37.9	64	7.1
	16:54	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	7.4	34.7	63	10.0
September 5, 2016	10:13	BDR BG – Upstream of BDRHEF intake	7.97	15.6	59.4	6.8
	10:20	BDR #1 – Downstream of BDRHEF intake	7.98	15.3	58.6	6.8
	10:52	BDR #2 – Upstream of BDRHEF Powerhouse	7.90	15.5	58.8	8.3
	11:05	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	8.25	31.5	65.3	9.5

5.4 *Recommendations*

IEM recommendations for the BDRHEF are as follows:

- CE should continue to direct all construction related wastewater to the active water treatment systems/settling ponds. CE should continue to monitor the newly constructed 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 a surface connection to Boulder Creek.
- CE should regularly monitor the BDRHEF intake active water treatment system to ensure the system is functioning as intended and that discharge into Boulder Creek is within BCWQGs. The water treatment system capacity should be regularly assessed to ensure the system can handle the necessary volumes of water.
- CE should continue to maintain the BDRHEF intake access road, and continue excavation/maintenance of ditch lines as discussed after the BC EAO site tour on June 9, 2016 and subsequent environmental meetings.

5.5 *Upcoming Works*

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

- BDRHEF tunnel final lining and rock stabilization.
- Removal of the crane pad at BDRHEF intake.
- Electrical component installation will continue at the BDRHEF powerhouse.
- Rebar, formwork, and concrete works will continue for the Intake structures.
- Instream works to divert Boulder Creek through the intake sluice way.
- Conduit installation between BDRHEF powerhouse and the intake access road.

- Switch yard installation will continue.

6.0 **Transmission Line – Monitoring Results**

6.1 *Transmission Line Construction Activities*

Construction Activities:

Segment 6

- Reinforcement of structures 140 & 141
- Demobilization and removal of temporary crossing structures
- Bin wall installation at structure 140

Segment 11

- Framing structures

Segment 12

- Framing structures
- Setting poles with helicopter

Segment 13

- Dressing poles
- Slashing and bucking felled timber
- Setting poles with helicopter

Segment 14

- Hand ground preparation for structures 323 – 326
- Machine ground preparation for structures throughout the segment
- Setting poles with helicopter

Segment 15

- Setting poles with helicopter

Segment 16

- Slashing and bucking timber

Environmental Summary:

- On September 2, Mumleqs removed the temporary crossings installed to access pole structure 140 and completed the reclamation of the access track (Photo 24). The IEM was onsite full time during the structure 140 reinforcement works (Photo 25) and no environmental concerns were noted.

- Mumlegs continued with the installation of armouring around the base of pole structure 141.

Photos:



Photo 24 – Removal of the temporary bridge crossing installed to access pole structure 140 (September 2, 2016).



Photo 25 – Nearing completion of the armouring for pole structure 140 (August 30, 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 IEMs 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 6

- Structure 141 anchoring and foundation protection

Segment 11

- Framing poles and preparing to string cable
- Ground preparation for anchor installation

Segment 12

- Framing poles and preparing to string cable

Segment 13

- Slashing and bucking felled timber

Segment 14

- Slashing and bucking felled timber

Segment 15

- Falling hazard trees and slashing

Segment 16

- CN rail crossing works
- Processing felled timber

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 August 2016:

Upper Lillooet Hydro Project - Wildlife Observation Form					
Date	Time	Observer (Company)	Species or Description	Location	Comments
8/2/2016	18:05	Gary Archer	Moose	KM28.5	-
8/2/2016	19:30	Catie Waters	Black Bear	KM41	Juvenile
8/3/2016	20:30	Catie Waters	Black Bear	KM42.3	Juvenile
8/4/2016	3:40	Gary Archer	Moose	KM12.2	Adult
8/4/2016	15:00	Éric Paquet	Moose	KM41.2	Adult
8/5/2016	9:30	Julien Gagnon	Deer	KM48.5	Scared fawn fell in river near Obermeyer
8/8/2016	9:35	Jean M. Pelletier	Coyote	KM36	-
11/8/2016	9:45	Stephanie Ellis	Coyote	KM37.6	Ran across road at KM37
12/8/2016	13:00	Stephanie Ellis	Black Bear	KM31	-
14/8/2016	16:40	Mike Caverly	Cougar	KM0.5 Boulder Intake Rd	Stood on road, clear view
15/8/2016	7:30	Lisa Andrew	Coyote	Camp Road	-
16/8/2016	0:30	Mario Chartrand	Cougar	KM2.5 Boulder	Ran across road
16/8/2016	16:21	Chase Reid	Black Bear	KM44	Ran across road
16/8/2016	19:10	Teddy (RDH)	Cougar	KM40.5	-
17/8/2016	4:30	Catie Waters	Coyote	KM39.5	Ran across road
18/8/2016	9:00	Nichole Boulton	Moose	KM13	Ran across road

Upper Lillooet Hydro Project - Wildlife Observation Form					
Date	Time	Observer (Company)	Species or Description	Location	Comments
18/8/2016	9:25	Nichole Boulton	Wolf	KM24	Up the side bank
20/8/2016	11:00	Nicholas Grondin	Black Bear	Penstock near Truckwash Creek	-
20/08/2016	14:00	Eric Paquet	Coyote	KM42	-
21/08/2016	3:10	Catie Waters	Coyote	KM42	-
31/08/2016	17:45	George (Andrtiz)	Black Bear	KM9.5	Juvenile on side of road
31/08/2016	6:45	Robin Ouellet	Brown Bear	KM45.5	1 adult 2 sub adults

8.0 Mountain Goat Monitoring Program

The spring 2016 Mountain Goat Monitoring Program is complete as of June 15, 2016 according to conditions of the Mountain Goat Management Plan. The mountain goat monitoring program will resume in November 2016.

To mitigate potential impacts to mountain goats during the summer months, 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 August 29, 2016: CE has completed excavation of the BDR tunnel and tunnel equipment has been parked in the designated parking area. These pieces of equipment continue to leak hydrocarbon fluids to the containment area. ACTION: CE to remove hydrocarbons that have been leaked and protect equipment with drip trays.			-

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#60	OPEN	Lillooet River FSR from KM46 – 48	The road fill slope of the Lillooet River FSR between KM46 – 48 requires ESC measures to ensure slope stability and prevent rill erosion from transporting material into the forested area below.	<ol style="list-style-type: none"> 1. Assess the road fill slope conditions following conduit installation in the Lillooet River FSR in this section. Update August 30: item remains outstanding 2. Provide a plan to protect the slope from an erosion and sediment transport perspective and/or a plan to initiate reclamation of the impacted area. Update August 30: item remains outstanding. 	August 8, 2016	August 16, 2016	-

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>							