



Upper Lillooet Hydro Project

Weekly Environmental Monitoring Report #72

Reporting Period: September 13 – September 26, 2015

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

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Owner Construction Permits and Approvals

Environmental Assessment Certificate No. E13-01 (Amendment 1, 2, 3, 4, 5 & 6)
Fisheries Act Subsection 35(2)(b) Authorization No. 09-HPAC-PA2-000303 (Amendment 1, 2)
Letter of Advice for the Transmission Line No. 09-HPAC0-PA2-000303
Leave To Commence Construction (ULRHEF) File No. 2002561
Leave To Commence Construction (BDRHEF) File No. 2002453
Leave To Commence Construction (TX Line) File No. 2002561/2002453
Conditional Water Licence (ULRHEF C130613) File No. 2002561
Conditional Water Licence (BDRHEF C129969) File No. 2002453
Conditional Water Licence (BDRHEF C131153) File No. 2003601
Licence of Occupation (ULRHEF #232384) File No. 2409871
Licence of Occupation (BDRHEF #232386) File No. 2409998
Licence of Occupation (TX Line #2423386) File No. 2410654
Occupant Licence to Cut (ULRHEF Amendments 1, 2, 3, 4, 5, 6, 7, 8) No. L49717
Occupant Licence to Cut (BDRHEF – KM 38 laydown) No. L49698
Occupant Licence to Cut (BDRHEF Amendments 1, 2, 3, 4) No. L49816
Occupant Licence to Cut (TX Line Amendment 1, 2, 3, 4, 5, 6, 7, 8, 9) No. L49697
General Wildlife Measure Exemption Approval Letter (TX Line & BDRHEF) File No. 78700-35/06 UWR and 39585-20 WHA
Heritage Conservation Act – Alteration Permit (ULRHEF) File No. 11200-03/2014-0033
Road Use Permit No. 6123-13-02 (Lillooet River FSR); 5673-13-01 (Rutherford Creek FSR); 7977-13-01 (Lillooet South FSR); 8015-13-01 (Ryan River); 8188-13-01 (Pemberton Creek FSR); and 9717-13-01 (Miller Bench FSR)
Junction Permit (ULRHEF & BDRHEF) File No. 11250-32/6123 (Amendment 1)
Aeronautical Obstruction Approval (Tx Line - Lillooet River Crossing) File No. 2013-004
Aeronautical Obstruction Approval (Tx Line - Ryan River) File No. 2013-005
Aeronautical Obstruction Approval (Tx Line - North Miller) File No. 2013-006
Aeronautical Obstruction Approval (Tx Line - South Miller) File No. 2013-007
Aeronautical Obstruction Approval (Tx Line - Pemberton Creek) File No. 2013-008
Aeronautical Obstruction Approval (Tx Line - Lillooet River near Pemberton) File No. 2013-009
Aeronautical Obstruction Approval (Tx Line - Lillooet River near Meager Creek) File No. 2013-010
Navigable Water Protection Act (ULRHEF) File No. 8200-2009-500434-001
Navigable Water Protection Act (BDRHEF) File No. 8200-2012-501-032-001
Navigable Water Protection Act (Tx Line – North Creek) File No. 8200-2013-500103-001
Navigable Water Protection Act (Tx Line – Lillooet River) File No. 8200-2013-500101-001
Navigable Water Protection Act (Tx Line – Lillooet River) File No. 8200-2013-500102-001
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

Contractor Construction Permits and Approvals

Magazine Licence File No. UL76018 (Renewal 1)
Section 8 Approval – Short Term Use of Water File (Lillooet River and Tributaries) No. A2006123 (Amendment 1)
Waste Discharge under the Code of Practice for the Concrete and Concrete Products Industry under the Environmental Management Act (Authorization No. 107204) Tracking No. 326969 (Renewal 1)
Wildlife Act Permits – Pacific Tailed Frog Salvage Permit # SU15-164805; Fish Salvage Permit # SU15-174722
Fisheries and Oceans Canada – Anadromous Fish Salvage Permit #XR 178 2015
BC Safety Authority – Temporary Construction Electrical Service Permit EL-140698-2014
Municipal Wastewater Regulation - Authorization # 107032
Water Supply System Construction Permits – VCH-14-613 for Main Camp
Water Supply System Permit to Operate Issued July 30th, 2014 for Main Camp
Section 6(3) and Schedule 3 Wildfire Regulations Fire Exemption for Ryan River Bridge File No. 14350-07
SLRD Building Inspection Report dated August 13, 2014 - Construction Camp Building Permit No. 10830
Lillooet River FSR Temporary Road Closures Approval File No. 11250-32/6123 (Amendment 1, 2)
Lillooet South FSR Temporary Road Closures Approval File No. 11250-32/7977
SLRD Building Permits for Mechanic Shop (10862) and Carpentry Shop (10836) March 18, 2015
SLRD Building Permit - Boulder Powerhouse Foundations, Stage 2, & Septic System Installation (10865) July 20, 2015
SLRD Building Permit – Upper Lillooet Powerhouse Foundations & Septic System Installation (10864) July 20, 2015

ACRONYMS:

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

1.0 Summary of Site Inspections for Reporting Period

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

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
September 13 - 19	SE, VD	Intermittent rain throughout week	<p>Construction Camp, Laydown Areas and the Lillooet River FSR</p> <ul style="list-style-type: none"> • Road maintenance on the Lillooet River FSR and camp access road <p>ULRHEF Intake</p> <ul style="list-style-type: none"> • Rebar and formwork installation • Drilling, blasting and tunnel stabilization • Dewatering to sediment basins <p>ULRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Drilling, blasting and tunnel stabilization • Installation of new pipes for settling ponds <p>ULRHEF Penstock</p> <ul style="list-style-type: none"> • Excavation, installation, welding and backfill from 2+900 to 3+900 <p>ULRHEF Powerhouse</p> <ul style="list-style-type: none"> • Rebar and formwork installation • Structural concrete pours <p>BDRHEF Intake, Crane Pad and Access Road</p> <ul style="list-style-type: none"> • Road maintenance on BDRHEF intake access road • Excavation and blasting for access ramp <p>BDRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Drilling, blasting and tunnel stabilization <p>BDRHEF Powerhouse</p> <ul style="list-style-type: none"> • Superstructure construction <p>TX-Line</p> <ul style="list-style-type: none"> • Segment 6 <ul style="list-style-type: none"> ➢ Backfill and pole straightening ➢ Stringing poles • Segment 11 <ul style="list-style-type: none"> ➢ Road upgrades on Ryan Road South ➢ Helicopter yarding • Segment 13 <ul style="list-style-type: none"> ➢ Road construction on Road 308 • Segment 14 <ul style="list-style-type: none"> ➢ Ground works for pole installations ➢ Stream 347A bridge installation
September 20 - 26	SE, TH, VD	Variable conditions with heavy rainfall on Sept. 20	<p>Construction Camp, Laydown Areas and the Lillooet River FSR</p> <ul style="list-style-type: none"> • Road maintenance on the Lillooet River FSR and camp access road • Emergency repair works on Lillooet River FSR following heavy rainfall <p>ULRHEF Intake</p> <ul style="list-style-type: none"> • Rebar and formwork installation • Concrete pour • Drilling, blasting and tunnel stabilization • Dewatering to sediment basins <p>ULRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Drilling, blasting and tunnel stabilization <p>ULRHEF Penstock</p> <ul style="list-style-type: none"> • Excavation, installation, welding and backfill from 2+900 to 3+900

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
			<p>ULRHEF Powerhouse</p> <ul style="list-style-type: none"> • Rebar and formwork installation • Structural concrete pours • Manifold installation <p>BDRHEF Intake, Crane Pad and Access Road</p> <ul style="list-style-type: none"> • Excavation and blasting for access ramp <p>BDRHEF Downstream Tunnel Portal</p> <ul style="list-style-type: none"> • Drilling, blasting and tunnel stabilization <p>BDRHEF Powerhouse</p> <ul style="list-style-type: none"> • Superstructure construction <p>TX-Line</p> <ul style="list-style-type: none"> • Segment 6 <ul style="list-style-type: none"> ➢ Emergency road works following rain event • Segment 11 <ul style="list-style-type: none"> ➢ Road upgrades on Ryan Road South ➢ Helicopter access logging at structures 267 – 275 • Segment 12 <ul style="list-style-type: none"> ➢ Miller Bench FSR bridge works ➢ Road construction on Road 305 • Segment 13 <ul style="list-style-type: none"> ➢ Road construction on Road 308 • Segment 14 <ul style="list-style-type: none"> ➢ Ground works for pole installations ➢ Stream 347A bridge installation

IEM Team Personnel: TH – Tom Hicks; SS – Stephen Sims; BA – Blake Aleksich; VD – Vanessa Dan; AA – Anthony Andrews; DA – Danita Abraham; TJ – Tammie Jenkins; SE – Stephanie Ellis

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.
September 13	<i>Email</i>	INX, SES, WEL	INX distributed the LTC for the Bridge 347A installation in Segment 14 on the TX Line.	-
September 16	<i>Kick-off meeting</i>	CE, SES	A kick-off meeting was held onsite to discuss safety, engineering and environmental concerns for construction of the access ramp at the BDRHEF intake. Discussions focused on preventing rock from falling into Boulder Creek to the event possible during blasting activities, and on drainage for the access ramp.	-
	<i>Email</i>	INX, CE, SES	INX distributed the LTC for the BDRHEF Intake and Portal Excavation.	-
September 17	<i>Email</i>	INX, SES, Ecofish	INX provided SES with Ecofish's results from a Truckwash Creek wildlife camera.	-
September 18	<i>Kick-off meeting</i>	SES, CE, Golder	A kick-off meeting was held onsite to discuss safety, engineering and environmental concerns for construction of the PAG Permanent Storage Facility at 41.7 KM on the Lillooet River FSR.	-

Date	Communication Type	Participants	Issues Discussed	ITM ID No.
	<i>Email</i>	INX, CE, WEL, SES	INX sent notice that the Boulder Creek Fire Area Restriction Order was fully rescinded as of September 15 with a note that the Lillooet River trail remained closed.	-
September 20	<i>Email</i>	INX, JEM, SES	INX informed JEM that rain events had caused extensive damage to the Lillooet River FSR between KM 5 and KM 33 and that CE was conducting emergency works to repair the road.	-
September 21	<i>Email</i>	INX, JEM, SES, MFLNRO, DFO, EAO, MOE	INX provided an update on the status of the Lillooet River FSR following flood damage and subsequent emergency works. Information concerning public safety, emergency response teams, contractors and road repair works was communicated to recipients.	-
	<i>Emails</i>	WEL, SES, INX	WEL informed recipients that debris flows and flooding had damaged and/or buried TX Line equipment and machinery in Segment 6. A follow-up update email informed INX and SES that no hydrocarbon spills had occurred due to the damaged equipment and that clean-up and recovery works were in process.	-
September 22	<i>Email</i>	INX, JEM, SES	INX informed JEM and SES that the emergency Lillooet River FSR road repairs had been completed and that MFLNRO bridge engineers were in the process of completing their ground assessment.	-
September 23	<i>Email</i>	INX, JEM, SES, MFLNRO, DFO, EAO, MOE	INX provided a second update on the status of the Lillooet River FSR and bridges following flood damage and emergency works. Information concerning public safety, emergency response teams, contractors and road repair works was communicated to recipients.	-
September 26	<i>Email</i>	SES, INX, WEL, Ecofish	SES provided an assessment on the flooding and debris slide damage to the South Lillooet FSR. SES confirmed that no hydrocarbon spills had occurred and works to recover damaged equipment were complete. SES identified two areas (KM 4 and 5) where flows had been diverted across the FSR due to a debris slide and beaver activity. SES provided recommendations for fish salvage and for fording.	-

3.0 Current Work Restrictions and Timing Windows

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

Component	Location	Wildlife/Archeology Concern	Construction/Timing Restrictions & Mitigations
TX Line	Segments 8 – 15	Within 150m of wetlands or 100m of Coastal Tailed Frog Streams	IEM presence is required when clearing within 150m of wetlands or 100m of CTF Streams, to ensure clearing areas are minimized.
		Riparian Vegetation Management Areas (RVMA)	IEM monitoring is required during clearing within RVMA's.

Component	Location	Wildlife/Archeology Concern	Construction/Timing Restrictions & Mitigations
		Surface Water Quality	IEM monitoring is required during culvert installation activities in non-fish bearing waters to document adherence to the Surface Water Quality Protection Plan objectives.
		Suitable Class 1 & 2 Grizzly Bear forage habitat	IEM monitoring is required when clearing within identified Class 1 & 2 Grizzly Bear forage habitat, to ensure clearing areas are minimized.
		Ryan River Drainage	Construction of the TX Line into and across the Ryan River drainage will occur during the less critical Grizzly Bear summer foraging period (June 1 – September 1).
Lillooet River FSR & ULRHEF	Access roads above the lower limit of the 200m buffer Truckwash Creek Migration Corridor to the ULRHEF intake	Mountain Goat UWR & Migration Corridor	If a goat observation occurs within 500 m line-of-sight of construction activities, construction must cease for at least 48 hours. The IEM must record and submit all goat observations to FLNR within 48 hours.

4.0 Upper Lillooet River HEF – Monitoring Results

4.1 Construction Camp, KM 38 Laydown, Access Roads & Lillooet River FSR

Activities:

- Maintenance work on the camp access road.
- Emergency road maintenance works on the Lillooet River FSR (Photo 1, Photo 2 and Photo 3).
- Routine maintenance of construction equipment within the mechanic shop and fuel management continued at the KM 38 laydown.
- The electric fences surrounding the construction camp were maintained and operational throughout this reporting period.

Environmental Summary:

- On September 20, heavy rainfall and runoff damaged the Lillooet River FSR in multiple locations. Road washouts, slides and flooding occurred at 19 KM, 22KM and 31 KM and a debris slide blocked the road at 32 KM (Photo 1). Emergency maintenance works were carried out by CE to repair the Lillooet River FSR and restore safe access to the Project site (Photo 2 and Photo 3).

Photos:



Photo 1 – Washout at 31KM on the Lillooet River FSR (September 20, 2015).



Photo 2 – Road maintenance works at 32 KM to repair debris slide damage (September 21, 2015).



Photo 3 – Culvert replaced at at 31 KM on the Lillooet River FSR following washout (September 21, 2015).

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

Construction Activities:

- Drilling, blasting and tunnel stabilization at the ULRHEF upstream portal.
- Rebar and formwork installation (Photo 4).
- Concrete pours for intake structure (Photo 5).
- Dewatering to ULRHEF intake sediment basins (Photo 6 and Photo 7).

Environmental Summary:

- All turbid or alkaline water resulting from activities at the ULRHEF intake or upstream tunnel portal is pumped to the ULRHEF intake sediment basins (Photo 6 and Photo 7). A dedicated CE crewmember is present to monitor the pumps within the intake work area and tunnel portal during active construction works. This person has the responsibility of

directing all turbid or alkaline water to the sediment ponds and must verify with CE environmental staff or the IEM prior to directing any water to the Lillooet River.

Photos:



Photo 4 – Rebar and formwork installation at the ULRHEF intake (September 19, 2015).



Photo 5 – Concrete pour at ULRHEF intake (September 23, 2015).



Photo 6 – Intake sump collecting seepage and runoff from worksite (September 23, 2015).



Photo 7 – ULRHEF intake sediment basins (September 18, 2015).

4.3 Downstream Tunnel Portal

Construction Activities:

- Drilling, blasting, mucking and stabilization works within the tunnel (Photo 8).
- Dewatering to downstream tunnel portal settling ponds (Photo 9).

Environmental Summary:

- Tunnelling works and dewatering to the downstream portal settling ponds continued during this reporting period. The settling pond water infiltrated to ground in the second cell with no discharge to the surrounding environment (Photo 9).
- New downstream tunnel portal settling ponds constructed at 2+750 on the penstock

alignment were tested for infiltration capability during this reporting period. The downstream tunnel portal wastewater was diverted to the new ponds on September 18. On September 19, SES and CE's environmental management team observed that water did not infiltrate to ground and that the new ponds were not suitable for use (Photo 10).

Photos:



Photo 8 – Current conditions at the ULRHEF downstream tunnel portal (September 20, 2015).



Photo 9 – ULRHEF downstream tunnel portal infiltration ponds (September 21, 2015).



Photo 10 – New settling ponds at 2+750 on the penstock alignment (September 19, 2015).

4.4 Penstock

Construction Activities:

- Penstock excavation, installation and backfill continued from 3+300 to 3+900 (Photo 11).
- Penstock welding continued from 2+900 to 3+700 (Photo 12).

Environmental Summary:

- On September 16 and 17, the IEM was present for a culvert extension installation at ASTR04 on the penstock alignment (Photo 13, Photo 14 and Photo 15). ASTR04 is an identified CTF watercourse. An Ecofish crew installed isolation netting and conducted an amphibian salvage prior to works and during dewatering; however no CTF were captured or observed. Worksite isolation was achieved with dam/sump and pump methods and works were completed in the absence of flowing water (Photo 13). During the culvert installation, two pulses of suspended sediment were recorded downstream of the works (Sept. 17, 14:35 and Sept. 18, 09:10) which temporarily exceeded BCQWGs. The sediment pulses occurred due to water seeping below the culvert inlet and contacting the bedding material. The contractor worked diligently to reduce the amount of suspended sediment as quickly as possible by reducing flow with an active diversion and working to compact the material to eliminate infiltration below the culvert. The IEM conducted water sampling during works. See Section 4.6 for water quality results.

Photos:



Photo 11 – Penstock excavation near 4+000 (September 24, 2015).



Photo 12 – Penstock welding near 3+500 (September 23, 2015).



Photo 13 – Sandbag berm and pump used to isolate work area from flowing water at ASTR04 (September 16, 2015).



Photo 14 – Culvert extension installation at ASTR04 penstock crossing (September 16, 2015).



Photo 15 – Culvert extension installation at ASTR04 penstock crossing (September 17, 2015).

4.5 *Powerhouse & Access Road*

Construction Activities:

- Formwork and rebar installation (Photo 16).
- Structural concrete pours on September 13 and 18 (Photo 17).

Environmental Summary:

- On September 13 and 18, the IEM was onsite to inspect the ULRHEF powerhouse during a concrete pour. The IEM conducted water quality sampling of the powerhouse sump discharge. All water samples were measured to have a pH <9 and suitable for discharge to the surrounding environment as per the Surface Water Quality Protection Plan. See Section 4.6 Water Quality Results.



Photo 16 – Current conditions at the ULRHEF powerhouse (September 23, 2015).



Photo 17 – Structural concrete pour at the ULRHEF powerhouse (September 18, 2015).

4.6 Water Quality Results

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

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (µS)	Temp (°C)
Routine Water Quality						
September 19, 2015	16:30	ULR Background – ULRHEF Intake	7.4	91.0	33	6.7
	16:45	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	7.6	81.0	47	7.0
	17:30	ULR # 1 – Upstream of ULRHEF Powerhouse	7.7	119.0*	39	7.4
	17:43	ULR #2 – Downstream of ULRHEF Powerhouse between KM 40.5 and KM 41	7.7	111.0*	33	7.5
	10:22	ULR #3 – Lillooet River FSR KM 38 Laydown – D/S of Boulder confluence	7.3	61.8	43	6.4
	9:34	ULR #4 – Lillooet River FSR KM 24 – D/S of all works and Meager confluence	7.6	68.0	55	7.7
September 24, 2015	13:50	ULR Background – ULRHEF Intake	6.8	1279AU*	89	6.2
	14:20	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	6.9	1118AU*	60	5.0
	14:58	ULR # 1 – Upstream of ULRHEF Powerhouse	7.1	1174AU*	57	6.2
	15:10	ULR #2 – Downstream of ULRHEF Powerhouse between KM 40.5 and KM 41	6.9	1195AU*	57	6.0
	15:37	ULR #3 – Lillooet River FSR KM 38 Laydown – D/S of Boulder confluence	7.1	1138AU*	59	7.0
	16:10	ULR #4 – Lillooet River FSR KM 24 – D/S of all works and Meager confluence	7.4	2759AU*	80	7.4
ASTR04 Culvert Extension Installation						
September 16, 2015	9:54	Background	-	1.54	-	-
	10:24	40m downstream of active works	-	3.25	-	-
	11:29	40m downstream of active works	-	1.72	-	-

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (µS)	Temp (°C)
	13:52	40m downstream of active works	-	0.89	-	-
	14:31	40m downstream of active works	-	1.11	-	-
September 17, 2015	14:27	40m downstream of active works	-	4.37	-	-
	14:35	40m downstream of active works	-	54.4	-	-
	14:40	40m downstream of active works	-	6.71	-	-
	9:10	40m downstream of active works	-	30	-	-
	9:20	40m downstream of active works	-	15.4	-	-
	9:30	40m downstream of active works	-	6.37	-	-
ULRHEF Powerhouse Concrete Pours						
September 18, 2015	10:12	Outlet of ULRHEF powerhouse dewatering hose	6.9	-	-	-

*The LaMotte 2020we turbidity meter measures in attenuation units (AU) when higher ranges of turbidity are encountered.

4.7 Recommendations

IEM recommendations for the ULRHEF are as follows:

- All seepage water in the intake excavation and portal should be conveyed to the sediment basins unless approved for discharge directly to the Lillooet River by the IEM or CE environmental manager.
- The IEM recommends that the access roads and tributaries on the penstock alignment be monitored regularly to ensure that no ESC issues develop with the continued installation works and traffic.
- The ULRHEF powerhouse sump water should be monitored regularly. Alkaline or turbid water should be pumped to the settling ponds for treatment.

4.8 Upcoming Works

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

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

5.0 Boulder Creek Hydroelectric Facility – Monitoring Results

5.1 Intake Access Road & Crane Pad

Construction Activities:

- Drilling, blasting and excavation for access ramp construction at BDRHEF intake (Photo 18, Photo 19 and Photo 20).
- Grubbing and stripping for spoil area at KM 3 on the BDRHEF intake access road (Photo 21).

Environmental Summary:

- CE completed all reasonable mitigation measure to reduce the amount of blast rock lost to the river during each blast at the Boulder intake crane pad; however blast rock did enter the river during some of the blasts. The IEM was onsite to monitor water quality following each blast and no visible water quality impacts were observed. The IEM has determined that the blast rock lost to the creek did not cause environmental impact or concern for the following reasons:
 - Boulder creek is non-fish bearing at the intake,
 - The rock was blasted using gel based explosives and not ANFO,
 - The rock was classified non-PAG,
 - The size of the rock was predominantly large, and mostly free of fines
 - The material fell within the authorized footprint of the intake work area;
 - No visual impacts to water quality were observed (water quality was not able to be sampled due to access limitations), and,
 - All the rock will be removed during construction of the intake structure.

Photos:



Photo 18 – Drilling and excavation for access ramp at BDRHEF intake (September 24, 2015).



Photo 19 – Conditions following blast for access ramp at BDRHEF intake (September 24, 2015).



Photo 20 – Excavation for access ramp at BDRHEF intake (September 26, 2015).



Photo 21 – Grubbing and stripping for spoil area at KM 3 on the BDRHEF intake access road (September 16, 2015).

5.2 *Downstream Tunnel Portal and Powerhouse*

Construction Activities:

- Drilling, blasting, mucking and stabilization works re-commenced within the tunnel (Photo 22).
- Dewatering of the tunnel and powerhouse to the oil water separator and settling ponds continued (Photo 23).

Environmental Summary:

- All wastewater related to the BDRHEF tunnelling works continued to be contained and conveyed to the downstream portal settling ponds for treatment (Photo 23). The water in the settling ponds continues to infiltrate to ground and has yet to reach the fourth cell.

Photos:



Photo 22 – BDRHEF downstream portal entrance and powerhouse structure (September 24, 2015).



Photo 23 – BDRHEF downstream portal settling ponds (September 21, 2015).

5.3 Water Quality Results

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

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (uS)	Temp (°C)
Routine Water Quality						
September 19, 2015	-	BDR BG – Upstream of BDRHEF intake *not currently accessible*	-	-	-	-
	-	BDR #1 – Downstream of BDRHEF intake *not currently accessible*	-	-	-	-
	18:02	BDR #2 – Upstream of BDRHEF Powerhouse	7.4	783AU*	40	7.5
	18:12	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	7.7	864AU*	38	7.0
September 24, 2015	-	BDR BG – Upstream of BDRHEF intake *not currently accessible*	-	-	-	-
	-	BDR #1 – Downstream of BDRHEF intake *not currently accessible*	-	-	-	-
	11:50	BDR #2 – Upstream of BDRHEF Powerhouse	7.0	30.0	95	7.0
	12:05	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	7.0	54.9	125	6.9

*The LaMotte 2020we turbidity meter measures in attenuation units (AU) when higher ranges are encountered. Increased turbidity in Boulder Creek was observed upstream of BDRHEF intake and likely caused by natural failures due to recent rain events.

5.4 Recommendations

IEM recommendations for the BDRHEF are as follows:

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

5.5 Upcoming Works

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

- Blasting and excavation works will continue for the BDRHEF intake access ramp.

- BDRHEF downstream tunnelling works will continue.
- Superstructure construction will continue.

6.0 Transmission Line – Monitoring Results

6.1 Transmission Line Construction Activities

Right-of-Way Clearing:

- Helicopter access logging from structures 267 – 275 in Segment 11.

Existing Road Upgrades and Access Road Construction

- Emergency road works following rain event in Segment 6.
- Road upgrades on South Ryan Road in Segment 11.
- Road construction on Road 305 in Segment 12.
- Road construction on Road 308 in Segment 13.
- Stream 347A bridge removal and installation in Segment 14 (Photo 24).

Transmission Line Pole Installation, Line Stringing and Clipping

- Pole installations and stringing in Segment 6.
- Groundworks for pole foundations in Segment 14.

Environmental Summary:

- On September 20, heavy rainfall and runoff damaged the Lillooet South FSR in multiple locations and caused the cessation of all TX Line construction activities. On September 21, it was discovered that debris flows had caused the burial of pulling equipment including a 700J bulldozer and a 210 excavator as well as damage to other equipment. A site investigation by WEL revealed that no hydrocarbon spills had occurred due to the damaged and buried equipment. Emergency maintenance works were carried out on September 21 and 22 to recover the buried machinery and restore access on the Lillooet South FSR.
- On September 25, the IEM conducted an assessment of the flood and debris flow damage to the Lillooet South FSR and provided the following observations and recommendations.
 - At the South Creek crossing, a debris slide and flooding had deposited large amounts of sand on the road and caused scouring in many locations. The IEM determined that this section of the FSR was passable but would eventually require extensive maintenance work.
 - At KM 3.5 and 4, slides had caused water to flow across the FSR (Photo 25) and a blocked culvert and ditch-line. The IEM determined that the area was passable and recommended eventual ditch maintenance and a culvert installation.
 - At KM 5, beaver activity and flooding had caused flows from a wetland to cross the FSR (Photo 26). The IEM captured a coho salmon parr in water flowing over the road

surface (Photo 27) and relocated it upstream in the wetland complex.

- At the locations where water flowing over the FSR was connected to a fish bearing watercourse, the IEM recommended that exclusion fencing be installed and a fish salvage be conducted.
- The IEM recommended fording the flooded sections of the FSR temporarily to complete the remainder of the transmission line works as the road substrates were coarse and fording would not significantly affect downstream water quality. Fording was permitted to occur under the conditions that WEL minimize the number of wet crossings to the minimum number required after completing fish isolation and salvage works. WEL notified the IEM that a fish salvage would be completed by their QP on Monday September 28 prior to resuming work activities in Segment 6.
- The IEM was present as required when clearing activities occurred within 150m of wetlands, 15m RVMAs (30m for CTF streams), 100m of Coastal Tailed Frog Streams, Class 1 & 2 suitable Grizzly Bear WHA and/or suitable forage habitat, moose and deer UWR, legally designated Old Growth Management Areas (OGMAs) or within Northern Goshawk, Spotted Owl or Western Screech-Owl nesting habitat (during breeding season). All flagged boundaries were respected during clearing activities. No environmental issues were observed.

Photos:



Photo 24 – Bridge removal at Stream 347A in Segment 14 (September 18, 2015).



Photo 25 – Water flowing across South Lillooet FSR in Segment 6 (September 25, 2015).



Photo 26 – Flooding on South Lillooet FSR due to beaver and flooding activity (September 25, 2015).



Photo 27 – Coho salvaged from South Lillooet FSR near KM 5 (September 25, 2015).

6.2 Water Quality Results

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

6.3 Recommendations

- The IEM has no recommendations at this time.

6.4 Upcoming Works

- Framing structures and stringing poles in Segment 6.
- Road construction in Segment 12 and 13.

7.0 Wildlife Sightings

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

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

8.0 Mountain Goat Monitoring Program

Noise monitoring and daily mountain goat monitoring will resume in October 2015.

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) 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		Mitigation Measures			
		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 – ULR#25)</i>							

9.2 Transmission Line

ITM Tracking Legend:		Work Item Open		Mitigation Measures			
		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>							