



# Upper Lillooet Hydro Project

## Weekly Environmental Monitoring Report #85

Reporting Period: January 3 – 16, 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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		<b>Date Prepared:</b> March 7, 2016 <b>Date Submitted:</b> March 9, 2016

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

### **ACRONYMS:**

<b>AMBNS</b>	Active Migratory Bird Nesting Survey	<b>INX</b>	Innergex Renewable Energy Inc.
<b>Andritz</b>	Andritz Hydro Canada Inc.	<b>ISW</b>	Instream Works
<b>ANFO</b>	Ammonia nitrate fuel oil (industrial explosive)	<b>ITM</b>	Environmental Issue Tracking Matrix
<b>ASMP</b>	Archaeological Sites Management Plan	<b>JEM</b>	JEM Energy Ltd. (Delegate Independent Engineer)
<b>ARD M/L</b>	Acid Rock Drainage and Metal Leaching	<b>LTC</b>	Leave to Construct
<b>BCEAO</b>	British Columbia Environmental Assessment Office	<b>MFLNRO</b>	Ministry of Forests, Lands and Natural Resource Operations
<b>BCWQG</b>	British Columbia Water Quality Guidelines	<b>MOE</b>	Ministry of Environment
<b>BDRHEF</b>	Boulder Creek Hydroelectric Facility	<b>MOTI</b>	Ministry of Transportation and Infrastructure
<b>BG</b>	Background	<b>NCD</b>	Non Classified Drainage
<b>BKL</b>	BKL Consultants Ltd.	<b>OLTC</b>	Occupational License to Cut
<b>CE</b>	CRT-ebc Construction Inc.	<b>PAG</b>	Potentially Acid Generating
<b>DFO</b>	Fisheries and Oceans Canada	<b>ROW</b>	Right of Way
<b>DS</b>	Downstream	<b>RVMA</b>	Riparian Vegetation Management Area
<b>EAC</b>	Environmental Assessment Certificate	<b>SES</b>	Sartori Environmental Services
<b>EAO</b>	Environmental Assessment Office	<b>SLRD</b>	Squamish-Lillooet Regional District
<b>Ecofish</b>	Ecofish Research Ltd.	<b>Stringer Line</b>	Temporary Backfeed Transmission Line
<b>Ecologic</b>	Ecologic Consulting	<b>TX Line</b>	Transmission Line
<b>EIR</b>	Environmental Incident Report	<b>ULRHEF</b>	Upper Lillooet Hydroelectric Facility
<b>ESC</b>	Erosion and Sediment Control	<b>UWR</b>	Ungulate Winter Range
<b>FAM</b>	Field Advice Memorandum	<b>VC</b>	Valued Component
<b>FSR</b>	Forest Service Road	<b>WEL</b>	Westpark Electric Ltd.
<b>Golder</b>	Golder Associates	<b>WEMR</b>	Weekly Environmental Monitoring Report
<b>GWR</b>	Mountain Goat Winter Range	<b>WHA</b>	Wildlife Habitat Area
<b>Hedberg</b>	Hedberg and Associates Ltd.	<b>WQ</b>	Water Quality
<b>HWM</b>	High water mark		
<b>IE</b>	Independent Engineer (True North Energy)		
<b>IEM</b>	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	Key Monitoring Locations & Activities
January 3 – 9, 2016	SE, DA, TH, AS	<p><b>Construction Camp, Laydown Areas and the Lillooet River FSR</b></p> <ul style="list-style-type: none"> <li>• Snow clearing and road maintenance on the Lillooet River FSR</li> </ul> <p><b>ULRHEF Upstream Tunnel</b></p> <ul style="list-style-type: none"> <li>• Mobilization of tunneling and grouting equipment</li> <li>• Drilling, water testing, and grouting boreholes</li> <li>• Water treatment system maintenance and monitoring</li> </ul> <p><b>ULRHEF Downstream Tunnel</b></p> <ul style="list-style-type: none"> <li>• Mobilization of tunneling equipment</li> <li>• Scaling, drilling, blasting and tunnel stabilization</li> </ul> <p><b>ULRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Snow removal and super structure construction</li> </ul> <p><b>BDRHEF Intake Access Ramp and Diversion Tunnel</b></p> <ul style="list-style-type: none"> <li>• No activity due to winter shutdown period (April 30, 2016)</li> </ul> <p><b>BDRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Drilling, blasting and tunnel stabilization</li> </ul> <p><b>BDRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Mechanical and electrical component installation</li> </ul> <p><b>TX-Line</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul>
January 10 – 16, 2016	SE, DA, AS	<p><b>Construction Camp, Laydown Areas and the Lillooet River FSR</b></p> <ul style="list-style-type: none"> <li>• Snow clearing and road maintenance on the Lillooet River FSR</li> </ul> <p><b>ULRHEF Upstream Tunnel</b></p> <ul style="list-style-type: none"> <li>• Drilling, water testing, and grouting boreholes</li> <li>• Water treatment system maintenance and monitoring</li> </ul> <p><b>ULRHEF Downstream Tunnel</b></p> <ul style="list-style-type: none"> <li>• Mobilization of tunneling equipment</li> <li>• Drilling, blasting and tunnel stabilization</li> </ul> <p><b>ULRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Snow removal and super structure construction</li> </ul> <p><b>BDRHEF Intake Access Ramp and Diversion Tunnel</b></p> <ul style="list-style-type: none"> <li>• No activity due to winter shutdown period (April 30, 2016)</li> </ul> <p><b>BDRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Drilling, blasting and tunnel stabilization</li> </ul> <p><b>BDRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Mechanical and electrical component installation</li> </ul> <p><b>TX-Line</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul>

**IEM Team Personnel:** TH – Tom Hicks; SS – Stephen Sims; BA – Blake Aleksich; DA – Danita Abraham; SE – Stephanie Ellis; 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.
January 7	<i>Email</i>	INX, SES	The IEM reviewed and provided clarifying information requested in the BC EAO compliance report issued to INX following the BC EAO site inspection completed in September 2015. The IEM clarified that spoil area BDR-07 was compliant with conditions 8.2.2 and 8.3.2 of the CEMP and the Erosion and Sediment Control Plan.	-
January 8	<i>Pre-work meeting</i>	SES, CE	SES and CE met to discuss the work plan for the opening of a sand borrow pit near KM36 of the Lillooet River FSR. Drainage ditch installation/repair, slope excavation, and road maintenance requirements were discussed and reviewed during the pre-work meeting.	-
January 7 – 10	<i>Email, site inspection</i>	CE, SES, INX, local trapper	CE notified the IEM and INX on January 7 that pine martins were present at the construction camp kitchen where they have begun to destroy food product in the food storage area. A local trapper (Tim Killey) holding the trapping licence that overlaps with the civil components of the Project area was contacted and he came to site to set traps and was able to successfully harvest 6 pine martins ultimately resolving the pest problem. INX and the IEM have requested that CE address previously highlighted waste management issues to prevent potential future problems with pine martins at the construction camp.	-
January 11	<i>Email</i>	INX, SES, JEM	INX distributed the updated Upper Lillooet Project PAG Material Tracking and Storage table confirming that there is no ARD or PAG material onsite as of the end of December 2015.	-
January 13 – 14	<i>Email, field level communications</i>	SES, CE, INX	SES requested an updated water treatment plan for the ULRHEF lower tunnel heading seepage and process water, as infiltration to ground through the ponds had ceased and water was discharging offsite (to vegetation and over a steep snow covered embankment). CE responded by installing a bypass valve to direct water to the second set of infiltration ponds as an interim measure until a more permanent solution could be developed and installed onsite. CE will continue to use the capacity in the two sets of infiltration pond to prevent discharging high pH or turbid water offsite.	-



### 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	Access roads above the lower limit of the 200m buffer Truckwash Creek Migration Corridor to the ULRHEF intake	Mountain Goat UWR & Migration Corridor	<p>Noise monitoring equipment is in place to monitor background noise levels and exceedances of the 75dbA noise level maximum resulting from blasting activities. Adaptive drilling/blasting noise mitigation strategies will be developed and implemented should activities show persistent exceedances of the noise level threshold.</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>If a mountain goat is observed within 500m line of sight of construction operations, construction must cease for at least 48 hours. The IEM must record and submit all goat observations to FLNR within 48 hours.</p>
BDRHEF intake	Portion of intake access road and crane pad within UWR	Mountain Goat UWR	<p>During winter months (November 1 – April 30), access to BDRHEF intake must be gated at least 500 m from UWR to restrict motorized use within the UWR, unless otherwise directed by MFLNRO.</p> <p>If a mountain goat is observed within a 500m line of site of a construction activity within UWR u-2-002 UL 12, construction activities will cease for at least 48 hours. Approval from the IEM must be obtained prior to recommencing construction activities.</p>

### 4.0 Upper Lillooet River HEF – Monitoring Results

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

Activities:

- Routine maintenance of construction equipment within the mechanic shop and fuel management continued at the KM 38 laydown. All hazardous substance materials (waste oil, contaminated soil, used oil/hydraulic fluid containers, etc.) were stored temporarily for off-site disposal in a designated area at the laydown. The materials were all well contained and protected from the weather.
- A pre-work meeting was conducted to discuss the opening of the KM36 sand borrow pit (Photo 1). Drainage ditches, excavating to stable slope angles and access road alignment continuity were discussed.

- Snow removal on the Lillooet River FSR and site access roads continued (Photo 2).

Environmental Summary:

- Snow management around the waste compactor, electric fences, and construction camp facilities was performed to maintain their operation following heavy snowfall during this reporting period (Photo 3 & Photo 4). CE continues to remove snow and repair the electric fence following each snowfall.

Photos:



Photo 1 – Pre-work meeting conducted onsite at the sand borrow pit near KM36 of the Lillooet River FSR prior to beginning works (January 8, 2016).



Photo 2 – Snow blowing flowing snowfall near KM47 of the Lillooet River FSR (January 13, 2016).



Photo 3 – Electric fences were snow free and operational during this reporting period (January 6, 2016).



Photo 4 – Removing snow from the roofs at the ULHP camp following heavy snowfall (January 13).

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

Construction Activities:

- Grout injection at the ULRHEF upstream tunnel portal resumed following re-mobilization of equipment on January 9.

- Dewatering to ULRHEF intake sediment basins (Photo 5).

Environmental Summary:

- During all grout injection work in the tunnel, seepage and process water was directed to the ULRHEF intake sediment basins for treatment (Photo 5). Prior to works, CE's environmental management team activated the CO<sub>2</sub> injection component of the water treatment system and prepared the flocculant injection system to be used if necessary.
- The IEM was at the ULRHEF intake to conduct water quality monitoring during active grout injection in the upstream tunnel. During works, the IEM conducted sampling in the treatment basins, in the cells downstream of the treatment systems (Photo 5) and at the outlet to the Lillooet River (Photo 6), when water leaving the system was close to pH 9. Water treatment was successful and water quality remained within Project guidelines (pH 6.5 – 9) during grouting works. Please see Section 4.5 Water Quality Results.

Photos:



Photo 5 – Water being directed to the first cell of the of the ULRHEF sediment basins during tunnel grouting (January 12, 2016).



Photo 6 – Water discharging to the Lillooet River from the ULRHEF sediment basins (January 9, 2016).

### 4.3 *Downstream Tunnel Portal*

Construction Activities:

- Drilling, blasting, mucking and stabilization works within the tunnel.

Environmental Summary:

- During an inspection on January 8, the IEM noted that water was discharging from the infiltration ponds through the outlet pipe and flowing along the toe of the penstock fill slope through a vegetated area (Photo 7). The IEM hiked along the flow path and found that the water was no longer infiltrating to ground and was discharging offsite, over a ledge that was inaccessible. The water was discharging offsite at 77 NTU and above BCWQGs for discharge to surface water; however, as water was discharging to vegetation and unlikely to have reached a watercourse via surface connection, the discharge is not considered to have had an impact on surface water quality or aquatic life. The IEM requested that CE prevent



the water discharging from the primary infiltration ponds as this water flows along the toe of the penstock fill before flowing over the edge of a steep embankment. By allowing discharge from the infiltration ponds, particularly once the snow begins to melt, the potential exists for erosion and sediment transport offsite towards the Lillooet River Trail. CE responded the following morning (January 9), by repairing the piping and valves to the discharge pipe that will direct water to a second set of infiltration ponds temporarily (Photo 8). By directing water between the two sets of ponds, CE can manage the infiltration rates to prevent the water from discharging offsite (Photo 9). CE is working on developing a more permanent solution in this area now that the infiltration capacity of the primary treatment ponds has slowed.

Photos:



**Photo 7 – Water discharging from the primary infiltration ponds at the ULRHEF downstream tunnel is no longer infiltrating in a vegetated area and is flowing over a steep bank at the toe of the penstock fill (January 8, 2016).**



**Photo 8 – Repairing the piping system at the primary ULRHEF downstream tunnel infiltration ponds so water can be direct to the second set of infiltration ponds (January 9, 2015).**



**Photo 9 –ULRHEF downstream tunnel seepage and process water being directed to the second set of infiltration ponds (January 11, 2016).**

#### 4.4 Powerhouse & Access Road

Construction Activities:

- Superstructure construction (Photo 10 and Photo 11Photo 11).
- Dewatering to Lillooet River.

Environmental Summary:

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



Photo 10 – ULRHEF powerhouse construction (January 7, 2016).



Photo 11 – ULRHEF powerhouse construction (January 13, 2016).

#### 4.5 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)
<b>Routine Water Quality</b>						
January 7, 2016	10:37	ULR Background – ULRHEF Intake	7.1	2.3	189	1.8
	9:45	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	7.5	4.1	145	0.2
	11:16	ULR # 1 – Upstream of ULRHEF Powerhouse	7.6	3.0	150	0.8

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Cond (µS)	Temp (°C)
	11:37	ULR #2 – Downstream of ULRHEF Powerhouse between KM 40.5 and KM 41	7.2	2.6	155	0.6
	15:10	ULR #3 – Lillooet River FSR KM 38 Laydown – D/S of Boulder confluence	7.4	1.3	135	1.4
	15:55	ULR #4 – Lillooet River FSR KM 24 – D/S of all works and Meager confluence	7.3	9.8	195	1.5
January 15, 2016	11:20	ULR Background – ULRHEF Intake	7.4	3.6	141	0.9
	11:40	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	7.5	1.8	143	0.4
	12:10	ULR # 1 – Upstream of ULRHEF Powerhouse	7.8	4.4	154	1.3
	12:30	ULR #2 – Downstream of ULRHEF Powerhouse between KM 40.5 and KM 41	7.7	2.7	139	1.3
	15:10	ULR #3 – Lillooet River FSR KM 38 Laydown – D/S of Boulder confluence	7.6	1.6	130	0.7
	14:10	ULR #4 – Lillooet River FSR KM 24 – D/S of all works and Meager confluence	7.8	1.4	165	1.9

The following table presents the results of WQ sampling results collected at the ULRHEF intake water treatment system.

Upper Lillooet Upstream Tunnel Portal - Grouting Works (2016)			
Date	Time (24hr)	Sample Location Description	pH
January 9	12:45	Pond 2	9.8
	12:57	Discharge to Lillooet River	7.3
January 11	13:16	Pond 7 (lower basins)	8.8
	14:30	Discharge to Lillooet River	8.0
January 12	14:10	Pond 7 (lower basins)	7.7
	15:40	Pond 7 (lower basins)	7.7
January 13	11:12	Pond 7 (lower basins)	8.2
	11:30	Pond 7 (lower basins)	8.1
	13:45	Pond 7 (lower basins)	7.9
January 14	15:20	Pond 7 (lower basins)	7.7
	15:56	Pond 7 (lower basins)	7.8
	16:45	Pond 7 (lower basins)	7.8
January 15	11:10	Pond 7 (lower basins)	7.8
January 16	9:30	Pond 7 (lower basins)	7.8
	10:15	Pond 5 (directly before secondary treatment)	8.9

#### 4.6 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.
- CE should develop a long-term plan to address water treatment at the ULRHEF downstream tunnel heading now that infiltration capacity in the ponds has reduced and water discharging

off-site does not meet surface water quality guidelines and poses an ESC risk to downstream areas. In the short term, CE should closely monitor the infiltration rates in both sets of treatment ponds to prevent offsite discharge of surface water.

- The ULRHEF powerhouse sump water should be monitored regularly. Alkaline or turbid water should be pumped to the settling ponds for treatment.

#### **4.7 Upcoming Works**

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

- Grout injection will continue at the ULRHEF upstream tunnel portal.
- Drilling, blasting and tunnel stabilization at the ULRHEF downstream tunnel.
- Dewatering to the ULRHEF intake sediment basins will continue.
- Superstructure construction will continue at the ULRHEF powerhouse.

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

#### **5.1 Intake & Diversion Tunnel**

##### Construction Activities:

- No activity due to winter shutdown period.

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

##### Construction Activities:

- Drilling, blasting and tunnel stabilization in the downstream tunnel portal.
- BDRHEF powerhouse mechanical and electrical component installation.
- Dewatering of the tunnel and powerhouse to the oil water separator and settling ponds continued (Photo 12).

##### 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 12).



Photos:



Photo 12 – BDRHEF downstream portal settling ponds (January 6, 2016).



Photo 13 – Preparing the generators for installation inside the BDRHEF powerhouse. (January 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 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)
<b>Routine Water Quality</b>						
January 7, 2016	-	BDR BG – Upstream of BDRHEF intake *not accessible*	-	-	-	-
	-	BDR #1 – Downstream of BDRHEF intake *not accessible*	-	-	-	-
	17:10	BDR #2 – Upstream of BDRHEF Powerhouse	7.3	0.2	115	1.9
	17:20	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	7.5	1.6	129	1.8
January 15, 2016	-	BDR BG – Upstream of BDRHEF intake *not accessible*	-	-	-	-
	-	BDR #1 – Downstream of BDRHEF intake *not accessible*	-	-	-	-
	12:54	BDR #2 – Upstream of BDRHEF Powerhouse	7.7	0.2	95	1.1
	13:10	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	7.6	0.4	99	1.2

## 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 in the upcoming reporting period:

- BDRHEF downstream portal tunnelling works will continue.
- Component installation will continue at the BDRHEF powerhouse.

## 6.0 Transmission Line – Monitoring Results

### 6.1 Transmission Line Construction Activities

- No activities occurred on the TX Line during this reporting period.

## 7.0 Wildlife Sightings

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

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

## 8.0 Mountain Goat Monitoring Program

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

- Access to the BDRHEF intake is gated and will now be locked fulltime to restrict motorized use within the UWR until April 30, 2016.
- Noise level monitoring data continued to be collected and used to adaptively manage construction noise and ensure that the 75db noise level threshold is not exceeded as

outlined in the Mountain Goat Management Plan. SES installed the noise monitoring equipment on January 8 as works resumed within 500m of UWR following the Christmas shutdown period.

- 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);
  - 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) is/are observed moving towards the ULRHEF intake and/or if a goat(s) is/are observed within a 500m line of site of a construction activity. No goats were observed within 500m line of sight of construction activities and no work stoppages were required.

## 9.0 Environmental Issues Tracking Matrix (ITM)

### 9.1 Hydroelectric Facilities (ULRHEF & BDRHEF)

<b>ITM Tracking Legend:</b>		Work Item Open		<b>Mitigation Measures</b>			
		Work Item Complete					
		Issue Closed					
<b>Issue Tracking</b>		<b>Environmental Issue</b>		<b>Mitigation Measures</b>			
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 – BDR#28 &amp; ULR#41)</i>							

### 9.2 Transmission Line

<b>ITM Tracking Legend:</b>		Work Item Open		<b>Mitigation Measures</b>			
		Work Item Complete					
		Issue Closed					
<b>Issue Tracking</b>		<b>Environmental Issue</b>		<b>Mitigation Measures</b>			
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>							