



# Upper Lillooet Hydro Project

## Weekly Environmental Monitoring Report #82

Reporting Period: November 29 – December 5, 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)

Distribution List		Prepared By
Name	Organization	
Herbert Klassen	Fisheries and Oceans Canada	 <p><b>J. Alex Sartori, RPBio</b> <i>Independent Environmental Monitor (IEM)</i></p>  <p><b>J. Stephen Sims, RPBio</b> <i>Delegate IEM</i></p>
James Davies	MFLNRO – Water Allocation	
Danielle Cunningham	MFLNRO – Land and Resources	
Frank DeGagne	MFLNRO – Land and Resources	
Nathan Braun	BC Environmental Assessment Office	
George Steeves	True North Energy – Independent Engineer	
Jennifer McCash	JEM Energy Ltd. – Independent Engineer	
Thomas Hicks	Sartori Environmental Services	
Peter Ramsden	Innergex Renewable Energy Inc.	
Oliver Robson	Innergex Renewable Energy Inc.	
Grant Lindemulder	Innergex Renewable Energy Inc.	
Joshua Zandbergen	Innergex Renewable Energy Inc.	
Julia Mancinelli	Innergex Renewable Energy Inc.	
Liz Scroggins	Innergex Renewable Energy Inc.	
Bas Brusche	Innergex Renewable Energy Inc.	
Matt Kennedy	Innergex Renewable Energy Inc.	
Renaud DeBatz	Innergex Renewable Energy Inc.	
Richard Blanchet	Innergex Renewable Energy Inc.	
Alex Yung	Innergex Renewable Energy Inc.	
Serge Moalli	CRT-ebc Construction Inc.	
Jonathan Drapeau	CRT-ebc Construction Inc.	
Éric Ayotte	CRT-ebc Construction Inc.	
Jean Pelletier	CRT-ebc Construction Inc.	
Jordan Gagne	CRT-ebc Construction Inc.	
Ian McKeachie	CRT-ebc Construction Inc.	
D'Arcy Soutar	Westpark Electric Ltd.	
Pontus Lindgren	Westpark Electric Ltd.	
Harriet VanWart	Lil'wat Nation	

## 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	Weather Conditions	Key Monitoring Locations & Activities
Sunday, November 29	BA, AS	Overcast, -5°C	<p><b>Construction Camp, Laydown Areas and the Lillooet River FSR</b></p> <ul style="list-style-type: none"> <li>• Snow removal, sanding, sand stockpiling and grating on the Lillooet River FSR and access roads</li> </ul> <p><b>ULRHEF Intake</b></p> <ul style="list-style-type: none"> <li>• Grout injection works</li> </ul> <p><b>ULRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Drilling in preparation for hydrojacking testing</li> </ul> <p><b>ULRHEF Penstock</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul> <p><b>ULRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Superstructure works</li> <li>• Andritz works</li> </ul> <p><b>BDRHEF Intake, Crane Pad and Access Road</b></p> <ul style="list-style-type: none"> <li>• Demobilization from site</li> </ul> <p><b>BDRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Closed due to work related accident and follow-up investigation</li> </ul> <p><b>BDRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Electrical Cable Trays installations ongoing</li> <li>• HPU (hydraulic systems) plumbing ongoing</li> </ul> <p><b>TX-Line</b></p> <ul style="list-style-type: none"> <li>➤ No scheduled works</li> </ul>
Monday, November 30	SE, AS	Sunny, -8°C	<p><b>Construction Camp, Laydown Areas and the Lillooet River FSR</b></p> <ul style="list-style-type: none"> <li>• Snow removal, sanding, sand stockpiling and grating on the Lillooet River FSR and access roads</li> </ul> <p><b>ULRHEF Intake</b></p> <ul style="list-style-type: none"> <li>• Grout injection works</li> </ul> <p><b>ULRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Drilling in preparation for hydrojacking testing</li> </ul> <p><b>ULRHEF Penstock</b></p> <ul style="list-style-type: none"> <li>• Shutdown for winter</li> </ul> <p><b>ULRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Superstructure works</li> <li>• Andritz works</li> </ul> <p><b>BDRHEF Intake, Crane Pad and Access Road</b></p> <ul style="list-style-type: none"> <li>• Site demobilization complete</li> </ul> <p><b>BDRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Closed due to work related accident and follow-up investigation</li> </ul> <p><b>BDRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Generator # 1 delivery</li> <li>• Electrical Cable Trays installations ongoing</li> <li>• HPU (hydraulic systems) plumbing ongoing</li> </ul> <p><b>TX-Line</b></p> <ul style="list-style-type: none"> <li>➤ No scheduled works</li> </ul>
Tuesday, December 1	SE, AS	Snowy, -2°C	<p><b>Construction Camp, Laydown Areas and the Lillooet River FSR</b></p> <ul style="list-style-type: none"> <li>• Snow removal, sanding, sand stockpiling and grating on the Lillooet River FSR and access roads</li> </ul>

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
			<p><b>ULRHEF Intake</b></p> <ul style="list-style-type: none"> <li>• Grout injection works</li> <li>• Installation of a secondary pH treatment system</li> </ul> <p><b>ULRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Drilling for first hydrojacking test completed</li> </ul> <p><b>ULRHEF Penstock</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul> <p><b>ULRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Superstructure works</li> <li>• Andritz works</li> </ul> <p><b>BDRHEF Intake, Crane Pad and Access Road</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul> <p><b>BDRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Closed due to work related accident and follow-up investigation</li> </ul> <p><b>BDRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Electrical Cable Trays installations ongoing</li> <li>• HPU (hydraulic systems) plumbing ongoing</li> </ul> <p><b>TX-Line</b></p> <ul style="list-style-type: none"> <li>• Segment 16 <ul style="list-style-type: none"> <li>➤ Prep activities, including blasting (structures 386-391)</li> </ul> </li> </ul>
Wednesday, December 2	SE, AS	Overcast, 2°C	<p><b>Construction Camp, Laydown Areas and the Lillooet River FSR</b></p> <ul style="list-style-type: none"> <li>• Snow removal, sanding, sand stockpiling and grating on the Lillooet River FSR and access roads</li> </ul> <p><b>ULRHEF Intake</b></p> <ul style="list-style-type: none"> <li>• Grout injection works</li> </ul> <p><b>ULRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Hydrojacking testing ongoing</li> </ul> <p><b>ULRHEF Penstock</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul> <p><b>ULRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Superstructure works</li> <li>• Andritz works</li> </ul> <p><b>BDRHEF Intake, Crane Pad and Access Road</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul> <p><b>BDRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Closed due to work related accident and follow-up investigation</li> </ul> <p><b>BDRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Electrical Cable Trays installations ongoing</li> <li>• HPU (hydraulic systems) plumbing ongoing</li> </ul> <p><b>TX-Line</b></p> <ul style="list-style-type: none"> <li>• Segment 16 <ul style="list-style-type: none"> <li>➤ Prep activities, including blasting (structures 386-391)</li> </ul> </li> </ul>
Thursday, December 3	SE, AS	Snowing, 0°C	<p><b>Construction Camp, Laydown Areas and the Lillooet River FSR</b></p> <ul style="list-style-type: none"> <li>• Snow removal, sanding, sand stockpiling and grating on the Lillooet River FSR and access roads</li> </ul> <p><b>ULRHEF Intake</b></p> <ul style="list-style-type: none"> <li>• Installation of tent around primary pH treatment system</li> <li>• Grout injection works</li> </ul> <p><b>ULRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Hydrojacking test completed on first hole and drilling began on second test hole</li> <li>• Winterization of the 44.7km laydown area</li> </ul>

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
			<p><b>ULRHEF Penstock</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul> <p><b>ULRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Superstructure works</li> <li>• Andritz works</li> </ul> <p><b>BDRHEF Intake, Crane Pad and Access Road</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul> <p><b>BDRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Closed due to work related accident and follow-up investigation</li> </ul> <p><b>BDRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Electrical Cable Trays installations ongoing</li> <li>• HPU (hydraulic systems) plumbing ongoing</li> </ul> <p><b>TX-Line</b></p> <ul style="list-style-type: none"> <li>• Segment 16               <ul style="list-style-type: none"> <li>➢ Prep activities, including blasting (structures 386-391)</li> </ul> </li> </ul>
Friday, December 4	SE, DA, AS	Rain/snow, 4°C	<p><b>Construction Camp, Laydown Areas and the Lillooet River FSR</b></p> <ul style="list-style-type: none"> <li>• Snow removal, sanding, sand stockpiling and grating on the Lillooet River FSR and access roads</li> <li>• Creation of escape gaps every 100m on the Lillooet River FSR</li> </ul> <p><b>ULRHEF Intake</b></p> <ul style="list-style-type: none"> <li>• Installation of tertiary pH treatment system</li> <li>• Installation of tent around primary pH treatment system</li> <li>• Grout injection works</li> </ul> <p><b>ULRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Hydrojacking began on second test hole once drilling was completed</li> <li>• Winterization of the 44.7km laydown area</li> </ul> <p><b>ULRHEF Penstock</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul> <p><b>ULRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Superstructure works</li> <li>• Quad manifold coatings (blasting and painting)</li> </ul> <p><b>BDRHEF Intake, Crane Pad and Access Road</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul> <p><b>BDRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Closed due to work related accident and follow-up investigation</li> </ul> <p><b>BDRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Electrical Cable Trays installations ongoing</li> <li>• HPU (hydraulic systems) plumbing ongoing</li> </ul> <p><b>TX-Line</b></p> <ul style="list-style-type: none"> <li>➢ No scheduled works</li> </ul>

Date	IEM Team Personnel	Weather Conditions	Key Monitoring Locations & Activities
Saturday, December 5	SE, DA	Snowing, 0°C	<p><b>Construction Camp, Laydown Areas and the Lillooet River FSR</b></p> <ul style="list-style-type: none"> <li>• Snow removal, sanding, sand stockpiling and grating on the Lillooet River FSR and access roads</li> <li>• Creation of escape gaps every 100m on the Lillooet River FSR</li> </ul> <p><b>ULRHEF Intake</b></p> <ul style="list-style-type: none"> <li>• Grout injection works</li> </ul> <p><b>ULRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Hydrojacking testing ongoing</li> <li>• Tunnel rehabilitation work recommended by Golder began. This included scaling of sidewalls, repairs to meshing, and installing additional rock bolts as directed by Golder.</li> <li>• Winterization of the 44.7km laydown area</li> </ul> <p><b>ULRHEF Penstock</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul> <p><b>ULRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Superstructure works</li> <li>• Quad manifold coatings (blasting and painting)</li> </ul> <p><b>BDRHEF Intake, Crane Pad and Access Road</b></p> <ul style="list-style-type: none"> <li>• No activity</li> </ul> <p><b>BDRHEF Downstream Tunnel Portal</b></p> <ul style="list-style-type: none"> <li>• Drilling, blasting and tunnel stabilization resumed after the WSBC Stop Work Order was rescinded on December 4, 2015.</li> </ul> <p><b>BDRHEF Powerhouse</b></p> <ul style="list-style-type: none"> <li>• Electrical Cable Trays installations ongoing</li> <li>• HPU (hydraulic systems) plumbing ongoing</li> </ul> <p><b>TX-Line</b></p> <ul style="list-style-type: none"> <li>➤ No scheduled works</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.
November 29	<i>Email</i>	SES, CE, INX	SES recommended that CE improve their pH treatment system at the ULRHEF sediment ponds to prevent water discharging to the Lillooet River from exceeding the pH = 9.0 threshold. The recommendations came after water discharging from the last cell of the treatment ponds was measured at pH 8.8.	-
December 3 - 5	<i>Email</i>	SES, CE, INX	The IEM observed domestic waste mixed in with construction waste that was attracting pine martins to a construction waste bin at KM48 of the Lillooet River FSR. The IEM reminded CE of the importance of proper waste management practices as outlined in the CEMP and Human-Wildlife Interaction Management Plan. CE removed the domestic waste and reminded all supervisors and site workers of the	-

Date	Communication Type	Participants	Issues Discussed	ITM ID No.
			need to bring all domestic waste back to the camp daily for proper disposal.	
December 4	<i>Email</i>	SES, INX, CE	The IEM notified the project team of a near miss related to pH treatment at the ULRHEF intake on December 3, 2015 when the pH of water discharging from the treatment ponds remained above pH =9.2 from 8:30 – 16 30 during grout injection operations in the ULRHEF tunnel. CE able to keep pH below 9.0 in the discharge water by pumping clean seepage water from the intake and entrance of the upstream tunnel portal into the discharge pipe emanating from the treatment ponds resulting in dilution to pH = 8.8. Because of the near miss, the IEM prepared FAM#7 requesting a shutdown protocol in the event of repeat situation and suggested improving the current system. CE responded by adding additional pH treatment systems; constructing warming tents to prevent the gas injection lines and regulators from freezing; and, by developing a protocol for recirculation of the water in the ponds until treatment is achieved.	FAM #7, ULR#40
	<i>Email</i>	INX, SES, JEM	INX provided the IEM and IE with a letter issued to CE in light of FAM #7 (see above). INX directed CE to address FAM#7, adjust the water treatment system to prevent a future exceedance, and monitor and maintain the water treatment system on a full time basis, effective immediately.	FAM #7, ULR#40

### 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 16	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 RVMAs.
		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.



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>IEM was onsite to oversee daily construction equipment shutdowns (November 1 - 30) beginning one hour before and two hours after sunrise as well as two hours before and one hour after sunset.</p> <p>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>An Exemption to the General Wildlife Measures for UWR u-2-002 UL 12 permits the following works to occur at the BDRHEF intake works beyond November 15, 2015.</p> <ul style="list-style-type: none"> <li>• Helicopter activity can occur up until December 15.</li> <li>• Blasting activity, including avalanche control, can occur up until December 15.</li> <li>• All other construction related activities can occur up until December 21.</li> </ul> <p>If a mountain goat is observed within a 500 m 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.
- The electric fences surrounding the construction camp were maintained and operational throughout this reporting period.
- Road maintenance and snow removal on the Lillooet River FSR and site access roads continued (Photo 1).
- Spoil pile at KM45 of the Lillooet River FSR was used as a laydown area for sand generation and stockpiling (Photo 2).

#### Environmental Summary:

- The IEM observed domestic waste mixed in with construction waste that was attracting pine martins to a construction bin at KM48 of the Lillooet River FSR. The IEM reminded CE of the importance of proper waste management practices as outlined in the CEMP and Human-Wildlife Interaction Management Plan. In response, CE removed the domestic waste and reminded all supervisors and site workers of the need to bring all domestic waste back to the camp daily for proper disposal.

#### Photos:



Photo 1 – Maintenance of ditch at KM42 of the Lillooet River FSR (December 4, 2015)



Photo 2 – Screening material at the spoil pile located at KM45 of the Lillooet River FSR. Screened material was stockpiled and used to sand the FSR (December 4, 2015).

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

### Construction Activities:

- Drilling, tunnel stabilization and grout injection at the ULRHEF upstream tunnel (Photo 3).
- Dewatering to ULRHEF intake sediment basins.
- ULRHEF intake shutdown for winter (Photo 4).

### Environmental Summary:

- All turbid and/or alkaline water resulting from activities at the ULRHEF upstream tunnel portal is pumped to the ULRHEF intake sediment basins for treatment, prior to discharging to the Lillooet River.
- The flocculent injection system at the intake sediment basins was observed to be operational during this reporting period and CE's environmental management team regularly maintained the system (Photo 5). The IEM conducted regular turbidity sampling at the ULRHEF intake sediment basin discharge location. Please see Section 4.6 Water Quality Results for this reporting period's data.
- During grout injection works in the ULRHEF tunnel on November 29 and December 3, 2015, the pH of water discharging to the Lillooet River approached close to pH = 9.0 (See Section 4.6 for detailed water quality sampling results). This prompted the IEM to recommend improvement to the water treatment system and development of a protocol for preventing and/or stopping the discharge of high pH water in the event the an exceedance of pH = 9.0 was recorded (See the attached FAM #7 and ITM ULR#40 for further details). CE responded to the IEM's request by:
  - Adding another back-up CO<sub>2</sub> injection system to pond #5 (for a total of three injection systems; Photo 6);
  - Constructing warming tents to prevent the CO<sub>2</sub> injection lines and regulators from freezing; and,
  - By developing a protocol for recirculation of the water in the ponds in the event of elevated pH at the discharge location.
- The above response provided by CE addressed the intent of FAM #7 and marked the closure of ITM ULR#40.
- Inside the ULRHEF tunnel at the face, the excess grout is dumped into bins which are left to cure and are then emptied when hardened (Photo 7 and Photo 8). This limits the amount of high pH-laden grout water that would normally enter the pumps and need to be treated.

Photos:



Photo 3 – ULRHEF upstream tunnel portal (December 2, 2015).



Photo 4 – ULRHEF intake shutdown for winter (December 2, 2015).



Photo 5 – Primary Sumas water treatment system near Pond 2 of ULRHEF intake basins (December 4, 2015).



Photo 6 - Secondary Sumas water treatment system at Pond 5 of ULRHEF intake basins (December 4, 2015).



Photo 7 – Grouting at the face of ULRHEF upstream tunnel portal (December 5, 2015).



Photo 8 – Geotextile-lined bins used in the tunnel to dispose of excess grout (December 5, 2015).

### 4.3 **Downstream Tunnel Portal**

#### Construction Activities:

- Drilling and hydrojacking tests were completed on two test holes during this reporting period.
- Tunnel rehabilitation as recommended by Golder began on December 5. Rehabilitation works included scaling of sidewalls, repairs to meshing, and installation of additional rock bolts as directed by Golder.

#### Environmental Summary:

- All tunnel seepage water was pumped to the downstream tunnel portal infiltration ponds.

### 4.4 **Penstock**

#### Construction Activities:

- No activity

### 4.5 **Powerhouse & Access Road**

#### Construction Activities:

- Superstructure construction (Photo 9 & Photo 10).
- Dewatering to the Lillooet River.

#### Environmental Summary:

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

#### Photos:



Photo 9 – Current conditions at the ULRHEF powerhouse (December 4, 2015).



Photo 10 – Current conditions at the ULRHEF powerhouse (December 4, 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)	Con d (µS)	Temp (°C)
<b>Routine Water Quality</b>						
December 4, 2015	9:50	ULR Background – ULRHEF Intake	7.3	38.2	143	0.1
	12:50	ULR #0.5 – Downstream of ULRHEF intake at Keyhole Bridge	7.4	25.3	147	1.9
	15:10	ULR # 1 – Upstream of ULRHEF Powerhouse	7.6	17.9	155	1.9
	15:37	ULR #2 – Downstream of ULRHEF Powerhouse between KM 40.5 and KM 41 (sampling not conducted due to avalanche risk)	7.4	17.8	160	2.0
	15:50	ULR #3 – Lillooet River FSR KM 38 Laydown – D/S of Boulder confluence	7.1	6.3	157	1.6
	9:50	ULR #4 – Lillooet River FSR KM 24 – D/S of all works and Meager confluence	7.0	3.2	188	1.9

<b>ULRHEF Upstream Tunnel - Grouting Works</b>						
Date	Time (24hr)	LOCATIONS (pH measurement)			Compliance point	Notes
		Pond 1	Pond 2-5	Pond 7		
November 29, 2015	11:00 –12:25	10.9	6.8	7.2	-	
	13:45 –14:45	11.9	9.0	7.6	-	IEM advised CE of concern that pH treatment needed maintenance
	14:55 – 15:15	-	8.9	7.8	-	
	15:45 – 16:15	-	8.6	8.8	8.7	
	16:30 – 17:10	-	8.8	-	8.6	IEM advised CE of near miss and recommended increasing CO <sub>2</sub> injection rate or number of injection points
November 30, 2015	11:30	-	-	7.2	7.4	No grouting; pressure testing (green dye)
	17:30	9	-	8.1	-	
December 1, 2015	9:30	-	7.51	7.44	-	Grouted from 16:00-16:45
	11:30	-	7.86	7.82	-	
	14:42	-	8.03	7.68	-	
	19:48	-	-	7.75	-	

December 2, 2015	11:30	-	9	9.1	7.3	Grouted from 9:30 - 11:30  Installed Secondary CO <sub>2</sub> system between ponds 5& 7
	12:30	11.4	8.9	9.12	7.1	
	13:30	9.4	9.09	8.29	7.08	
	14:30	9.74	8.81	7.47	7.01	
	15:30	8.96	9.04	7.44	6.99	
	16:30	11	8.63	7.1	7.15	
	17:30	11.3	9.1	7.43	6.98	
	20:00	9.36	10.01	7.45	7.06	
	21:00	-	9.75	8.15	-	
December 3, 2015	9:30	-	-	9.8	8.6	CO <sub>2</sub> canister had run out overnight  No access to compliance point from 12:00-14:00 for avalanche control
	10:50	-	-	10.1	8.8	
	11:10	-	-	-	8.4	
	11:30	-	-	-	8.1	
	12:10	8.6	10.56	10	-	
	13:00	8.46	10.47	10.1	-	
	14:00	-	-	9.92	7.71	
	14:20	-	-	-	7.45	
	14:40	12.3	10.33	9.21	7.5	
	16:30	12	9.84	9.73	8.21	
December 4, 2015	12:21	-	-	8.4	-	No grouting; only polyurethane
	14:00	-	-	8.49	-	
	16:30	-	-	8.2	-	
December 5, 2015	8:30	7.43	7.32	7.1	-	First round of grouting overnight Second round of grouting at 8:55; visibly turbid water from 9:30-12:30 Used polyurethane beginning at 12:30  pH in sump inside tunnel during Polyurethane = 9.10/9.05
	9:30	12	7.4	7.45	7.03	
	10:30	12.1	7.43	7.1	-	
	11:30	12.1	7.1	7.55	-	
	12:30	10.2	8.22	7.85	-	
	13:30	10.9	7.67	7.2	-	
	14:30	9.5	7.2	6.8	-	
15:30	9.9	7	6.7	7.1		

#### 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.
- CE should continue to closely monitor the Sumas treatment systems to ensure that the CO<sub>2</sub> canisters and flocculent system continue to function at full capacity to prevent an exceedance of turbidity or high pH into the Lillooet River.
- All tunnel seepage water at the ULRHEF downstream portal should continue to be pumped to the downstream tunnel portal infiltration ponds
- 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):

- Grouting activities will continue at the ULRHEF upstream tunnel heading.
- Dewatering to the ULRHEF intake sediment basins will continue.
- Tunneling activities will continue at the ULRHEF downstream portal
- Superstructure construction will continue at the ULRHEF powerhouse.

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

#### 5.1 *Intake Access Ramp & Diversion Tunnel*

Construction Activities:

- All equipment was removed from the BDRHEF intake and the site closed for the winter on November 30, 2015. The gate at 3.3KM of the BDRHEF intake access road is locked and will remain closed until May 1, 2016.
- The upstream cofferdam and a temporary downstream cofferdam were both completed during the previous reporting period (Photo 11 & Photo 12). A permanent downstream cofferdam will be constructed in the spring.

Environmental Summary:

- No instream works occurred during this reporting period and no environmental issues were observed or reported at the BDRHEF intake.

Photos:



**Photo 11 – Upstream cofferdam at BDRHEF Intake (November 30, 2015).**



**Photo 12 – Partial downstream cofferdam constructed at BDRHEF Intake (November 30, 2015).**



## 5.2 Downstream Tunnel Portal and Powerhouse

### Construction Activities:

- Drilling, blasting, mucking and stabilization works within the tunnel resumed December 6.
- Andritz preparing for installation of the generators inside the powerhouse.
- Dewatering of the tunnel and powerhouse to the oil water separator and settling ponds continued.

### Environmental Summary:

- All wastewater related to the BDRHEF tunnelling works continued to be contained and conveyed to the downstream portal settling ponds for treatment

## 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>						
December 4, 2015	-	BDR BG – Upstream of BDRHEF intake *not currently accessible*				
	-	BDR #1 – Downstream of BDRHEF intake *not currently accessible*				
	16:20	BDR #2 – Upstream of BDRHEF Powerhouse	7.0	1.1	104	1.3
	16:40	BDR #3 – Downstream of BDRHEF Powerhouse at Pebble Creek Bridge	7.0	1.6	101	1.5

## 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):

- BDRHEF downstream portal tunnelling works will continue.
- Generator installation by Andritz will continue

## 6.0 **Transmission Line – Monitoring Results**

### 6.1 *Transmission Line Construction Activities*

Right-of-Way Clearing:

- No activity.

Existing Road Upgrades and Access Road Construction

- No activity.

Transmission Line Pole Installation, Line Stringing and Clipping

- Site preparation activities (including blasting) for structures 386-391 in Segment 16.

Environmental Summary:

- No environmental issues were observed or reported during work in Segment 16.

### 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*

- No upcoming activity; TX Line works will resume in the spring of 2016.

## 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 sightings 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

The Owner, Contractors, and IEM team reported the following wildlife sightings in November 2015.

Upper Lillooet Hydro Project - Wildlife Observation Form					
Date	Time	Observer (Company)	Species or Description	Location	Comments
11/2/2015	7:22	Ian McKeachie	Moose	30KM FSR	Grazing next to road
11/7/2015	6:22	Marc Imbeault	Coyote	Pad 2	
11/16/2015	11:00	Anne Sutherland	Coyote	45km and 39km FSR	Trotting down the road
11/17/2015	7:30	Eric Ayotte	Moose	29KM FSR	
11/17/2015	18:05	Ian McKeachie	Moose	43.5KM FSR	Trotting down the road
11/17/2015	10:00	Sharon French	Cougar	31KM FSR	Crossing the road
11/18/2015	8:30	Labourer	Moose	49KM FSR	on the road
11/22/2015	17:30	Julien Gagnon	Moose	47KM FSR	Moose charged stopped vehicle, contacted the vehicle off without harming himself and ran away.
11/25/2015	8:10	Pierre Poirier	Bobcat - tracks	Camp - Pad 2 and 4	
11/25/2015	11:25	Blake Aleksich	Moose	47KM FSR	Walked down road and down embankment
11/26/2015	9:45	Cindi McPherson	Moose	46KM FSR	On the road
11/30/2015	10:30	Stephanie Ellis	Bobcat	15KM FSR	Travelling

## 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.

- IEM was onsite to audit daily construction equipment shutdowns (November 1 - 30) beginning one hour before and two hours after sunrise as well as two hours before and one hour after sunset.
- 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.
- The IEM or designate was on site to monitor Mountain Goat activity within 500m of construction activities at the ULRHEF intake and the ULRHEF downstream tunnel portal. Mountain goats were monitored from four sites:
- Truckwash Creek viewing river right of the Migration Corridor– MG-OBS01 (10U 467955 5612773):
- Keyhole Falls viewing the south side u-2-002 UL11 – MG-OBS02 (10U 466593 5613988); and,
- Garibaldi Pumice mine site viewing u-2-002 UL 19 – MG-OBS03 (10U 467388 561408); and,
- Salal Creek monitoring site viewing u-2-002 UL 8 – MG-OBS04 (10U 466133 5613991).

Monitoring effort was split between all sites during daylight hours, unless safety concerns or weather conditions interfered. The order of site visits rotated daily. Construction activities must cease if a goat(s) are observed moving towards the ULRHEF intake and/or if a goat(s) are observed within a 500m line of site of a construction activity. No goats were observed within 500m line of sight of construction activities and no work stoppages were required.

## 9.0 Environmental Issues Tracking Matrix (ITM)

### 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#40	CLOSED	ULRHEF intake – Treatment of high pH water generated by grouting activities	The IEM prepared FAM#7 requesting that CE provide a protocol for shutting down the water treatment system. This protocol should ensure that if pH approaches 9, there is a mechanism for preventing this water from discharging and causing an exceedance from occurring, and/or a way to stop the continued discharge of high pH water to the receiving environment in the event an exceedance is recorded.	1. Prepare a protocol for shutting down the water treatment system if it is overcome by the amount of high pH water and will/does result in the discharge of water above pH 9. Update: CE provided a protocol for shutting down the treatment system if water is near or above pH 9 at the discharge from pond 7. CE has also committed to improving the pH treatment system.	December 4, 2015	December 4, 2015	December 4, 2015
<i>No outstanding environmental issues (next ITM – BDR#28 &amp; ULR#41)</i>							

### 9.1 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>							



# FIELD ADVICE MEMO (FAM)

<b>Project:</b>	Upper Lillooet Hydro Project	<b>FAM Number:</b> (yyyy-mm-dd_FAM##)	2015-12-04_FAM#7
<b>FAM Author:</b>	Tom Hicks, Lead Monitor Sartori Environmental Services	<b>Date of FAM Issuance:</b>	December 4, 2015
<b>Distribution List:</b> (Name - Company)	To: Jean Pelletier, Jordan Gagne & Ian McKeachie - CRT-ebc		
<b>Environmental Incident Reports (EIR):</b> (If applicable)	This FAM is not associated with an environmental incident; it has been prepared to provide recommendations in light of the near miss related to the discharge of high pH water from the ULRHEF intake water treatment system. This issue will be tracked in the Issue Tracking Matrix in the Weekly Environmental Monitoring Report.		

## Identified Environmental Issue(s):

As outlined in the Surface Water Quality Protection Plan:

When pH is 6.5-9.0, there are unrestrictive changes permitted within this pH range. Long-term changes should be examined carefully as even slight pH changes have an impact on carbon dioxide concentrations have the potential to affect aquatic communities. and in the CEMP:

Raw concrete and concrete wash water is strongly alkaline and is considered a deleterious substance when it causes water pH to exceed 9.0. Alkaline waste water generated must be prevented from entering aquatic habitats.

Yesterday's grouting activities nearly resulted in an exceedance of the pH threshold (pH >9.0) of water discharging from the treatment ponds to the Lillooet River for the second time. Throughout the day (from 9:30 - 16:30) the pH in the last cell of the treatment ponds never dropped below 9.2, but was mixed with clean seepage from the tunnel face and intake area before discharging to the Lillooet River. Fortunately this dilution resulted in a maximum pH of 8.8 recorded in the discharge to the Lillooet River.

Based on the water quality measured during the first few days of cement grouting activities we (the IEM) are not confident that the current treatment system in place will prevent an exceedance of pH 9.0 during prolonged grouting works.

During discussions surrounding what to do in the event of an exceedance it has come to light that there is currently no protocol in place for immediate shutdown of the system to halt the continued discharge of >9 pH water to the Lillooet River. We understand that shutting off the pumps at the portal face could result in flooding the tunnel, which we have been told is not safe or possible at the current time.

## Requested Outcome(s)

The IEM requests that CE provide the IEM with a protocol for shutting down the water treatment system. This protocol should ensure that if pH approaches 9, there is a mechanism for preventing this water from discharging and causing an exceedance from occurring, and/or a way to stop the continued discharge of high pH water to the receiving environment in the event an exceedance is recorded.

We look forward to your response by end of day. Should the pH levels exceed 9.0 before the shutdown protocol is provided or enacted we will be forced to issue a stop work order in the field.