

Upper Lillooet Hydro Project

Weekly Environmental Monitoring Report #5

Reporting Period: October 13th – October 19th, 2013

Lillooet River Forest Service Road (FSR) realignment and Transmission Line Clearing (Seg. 1 & 2)

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)

Environmental Assessment Certificate No.E13-01 (Amendment 1)



Occupant Licence to Cut (FSR realignment) No. L49717

DFO Letter of Advice File No. 09-HPAC-PA2-00303

Occupant Licence to Cut (TX Line S.1-S5, Heli Pads) No. L49697 (Amendment 1)

Section 57 Authorization (hiking trail construction) File No. 16660-20

Road Use Permit No. 6123-13-02

Distribution List		Prepared By
Name	Organization	
Trevor Andrews	Fisheries and Oceans Canada	 J. Alex Sartori, R. P. Bio. Independent Environmental Monitor &  J. Stephen Sims, R. P. Bio. Delegated Environmental Monitor
James Davies	MFLNRO – Water Allocation	
Nathan Braun	BC Environmental Assessment Office	
George Steeves	True North Energy – Independent Engineer	
Jennifer McCash	True North Energy – Independent Engineer	
Krys Muniak	Innergex Renewable Energy Inc.	
Oliver Robson	Innergex Renewable Energy Inc.	
Julia Mancinelli	Innergex Renewable Energy Inc.	
Liz Scroggins	Innergex Renewable Energy Inc.	
Gaétan Turgeon	CRT-EBC Construction Inc.	
Éric Ayotte	CRT-EBC Construction Inc.	
Tim Wales	CRT-EBC Construction Inc.	
Jean Pelletier	CRT-EBC Construction Inc.	
D’Arcy Soutar	Westpark Electric Ltd.	
Pontus Lindgren	Westpark Electric Ltd.	
Harriet VanWart	Lil’wat Nation	
		Date Prepared: October 22, 2013 Date Submitted: October 25, 2013

ACRONYMS:

BCWQG	British Columbia Water Quality Guidelines
BDRHEF	Boulder Creek Hydroelectric Facility
BG	Background
CRT-EBC	CRT-EBC Construction Inc.
DS	Downstream
Ecofish	Ecofish Research Ltd.
ESC	Erosion and Sediment Control
FSR	Forest Service Road
Hedberg	Hedberg and Associates Ltd.
IEM	Independent Environmental Monitor
Innergex	Innergex Renewable Energy Inc.
ITM	Issue Tracking Matrix
LTC	Leave to Construct
MFLNRO	Ministry of Forestry, Lands and Natural Resources
MOE	Ministry of Environment
RVMA	Riparian Vegetation Management Area
SES	Sartori Environmental Services
TX Line	Transmission Line
ULRHEF	Upper Lillooet River Hydroelectric Facility
UWR	Ungulate Winter Range
WQ	Water Quality
WEL	Westpark Electric Ltd.
WEMR	Weekly Environmental Monitoring Report

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:

Day	Date	IEM Team Personnel	Weather Conditions	Monitoring Locations & Key Environmental Information
Sunday	Oct 13	-	-	-
Monday	Oct 14	-	-	-
Tuesday	Oct 15	TH	Sun and cloud	Lillooet River FSR Realignment at Truckwash Creek <ul style="list-style-type: none"> Drilling at the west heading excavation in preparation for blasting TX Line – Segment 2 <ul style="list-style-type: none"> Hand falling within Boulder Creek RVMA Truckwash Creek Trail <ul style="list-style-type: none"> Trail construction continued
Wednesday	Oct 16	TH, ML	Sun and cloud	Lillooet River FSR Realignment at Truckwash Creek <ul style="list-style-type: none"> 1600mm culvert installation Drilling began in preparation for blasting TX Line – Segment 1&2 <ul style="list-style-type: none"> Hand falling in Stream 33A and Stream 30A RVMA Hand falling above FSR requiring temporary road closures (poles 5-6) Truckwash Creek Trail <ul style="list-style-type: none"> Trail construction continued
Thursday	Oct 17	TH,SS	Sun and cloud	Lillooet River FSR Realignment at Truckwash Creek <ul style="list-style-type: none"> Drilling and blasting proceeded following implementation of mitigations measures Finalized installation of 1600mm culvert TX Line – Segment 1&2 <ul style="list-style-type: none"> Hand falling in Stream 34A RVMA Hand falling above the Lillooet River FSR requiring temporary road closures (poles 5-6) Truckwash Creek Trail <ul style="list-style-type: none"> Trail construction continued
Friday	Oct 18	TH	Sun and cloud	Lillooet River FSR Realignment at Truckwash Creek <ul style="list-style-type: none"> Drilling and blasting proceeded following implementation of mitigations measures TX Line – Segment 1&2 <ul style="list-style-type: none"> No activities Truckwash Creek Trail <ul style="list-style-type: none"> Trail construction continued
Saturday	Oct 19	TH	Sun and cloud	Lillooet River FSR Realignment at Truckwash Creek <ul style="list-style-type: none"> Hand falling within Grizzly Bear Class 1 suitable fall forage habitat (ULL-GB05) TX Line – Segment 1&2 <ul style="list-style-type: none"> No activities

IEM Team Personnel: ML – Mackenzie Lee; SS – Stephen Sims; TH – Tom Hicks

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.
Oct. 16	Email correspondence	CRT-EBC, Innergex, SES	<ul style="list-style-type: none"> IEM approved adaptive mitigation plan for blasting within 500m of Grizzly Bear Class 1 habitat (suitable fall forage; ULL-GB05) 	N/A
Oct. 17 & 18	Office presentation and field review of Mountain Goat monitoring program	WEL, CRT-EBC Innergex, SES, Ecofish	<ul style="list-style-type: none"> Monitoring locations and protocol Snow measurement locations and protocol Timing restrictions 	N/A
Oct. 14-19	Email updates	WEL, SES	<ul style="list-style-type: none"> Daily communication of upcoming clearing activities 	N/A

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 Concern	Construction/Timing Restrictions & Mitigations
ULRHEF	Lillooet River FSR realignment at Truckwash Creek	Grizzly Bear Class 1 suitable fall forage habitat (ULL-GB05)	<i>IEM was onsite to oversee clearing and blasting activities within 500m of suitable Grizzly Bear fall forage habitat and ensure clearing boundaries were minimized and appropriate noise mitigation measures were implemented.</i>
TX Line	Segment 2 Clearing within RVMA's	<i>Working within 15m of Streams 30A, 33A, and 34A.</i>	<i>IEM was onsite for clearing activities (hand falling) within the RVMA buffers. Vegetable based bar oil was used in the chainsaws and no trees were felled into the stream. Each area was walked with the crews prior to falling to review the site specific clearing prescriptions.</i>
	Segment 2 Pole locations 18 - 20	<i>Coastal Tailed Frog stream (Boulder Creek)</i>	<i>IEM was onsite for clearing activities within 30m of suitable Coastal Tailed Frog habitat prior to hand falling. No removal of course woody debris was completed with any type of logging machinery. Vegetable based bar oil was used in the chainsaws and no trees were felled into the stream.</i>

4.0 Upper Lillooet River Hydroelectric Facility

4.1 Monitoring Results

4.1.1 Lillooet River FSR Realignment at Truckwash Creek

Construction Activities

- Continued clearing, bulk excavation and road base construction on west side of Truckwash Creek from FSR realignment Stn 2+200m – 1+950m. Drilling began on October 15, 2013 and the first blast occurred on October 17, 2013 (Photo 2) and continued for the remainder of the reporting period.
- Construction at the east heading, including bulk excavation and the installation of a 1600mm CSP culvert (Stn. 1+430).
- Installation of a visual barrier along the perimeter of the stream located at the intersection of the east Truckwash Creek work heading and the current FSR alignment was completed during this reporting period. The visual barrier was installed as recommended in the previous monitoring report (WEMR #4).
- Hand falling trees within 500m of Grizzly Bear Class 1 habitat (suitable fall forage; ULL-GB05) occurred on October 19th, 2013. Clearing limits were minimized.

Environmental Summary:

- IEM was onsite periodically throughout this reporting period to oversee general construction activities and full-time during clearing in Grizzly Bear Class 1 suitable fall forage habitat (ULL-GB05) and during culvert installation activities.
- CRT-EBC provided the IEM and Innergex with adaptive noise reduction mitigations on October 16th to address ongoing blasting activities occurring up until October 31 as part of the FSR realignment works within Grizzly Bear Class 1 habitat (suitable fall forage; ULL-GB05). Mitigations submitted to, and subsequently approved by the IEM, included:
 - Blasting a maximum of 10 holes at a time, with minimum charges;
 - IEM to monitor for grizzly bear presence in the area prior to blasting; and,
 - IEM onsite during ongoing activities to oversee the implementation of mitigation measures and assess the perceived noise resulting from blasting.

Both the first and second blast resulted in barely audible noise level peaks above background levels (peak 57dBs, background ~52dBs), and the second blast was not registered on the rudimentary acoustic monitoring equipment (instantaneous dB only – onsite as noise consultants were assisting IEM in identifying noise monitoring locations as part of upcoming noise mitigations associated with construction activities within 500m of Mountain Goat UWRs and migration corridor). Based on these monitoring results, the IEM recommends continued implementation of the maximum 10-hole sets with the minimum charges required. Acoustic monitoring of

blasting activities will occur for each blast beginning November 1st (as per the above mentioned requirements).

- Culvert installation (non-fish bearing stream) began at Stn. 1+430 on October 16th and was completed the following day (Oct. 17th). The initial works involved the installation of a small coffer dam (conducted by hand where possible), to direct flows to the right bank of the watercourse, outside of the work area (Photo 1). Once rocks were placed sufficiently to dewater the work area, SES conducted a precautionary Coastal Tailed Frog survey. No tadpoles or adults were observed. Once the survey was completed, the cofferdam was reinforced with native material, and bedding material was placed in preparation for culvert installation. WQ was routinely measured by the IEM, and a temporary exceedance of BCAWQG (<25 minutes; 10:10 - 10:35am) was observed during the initial placement of bedding material.

Following the installation of bedding material, culvert placement and inlet armouring, hydraulic reconnection was attempted as the cofferdam was removed, directing water through the newly installed culvert. Water began to enter the culvert, creating a temporary exceedance of BCAWQG (<25 minutes; 11:30 - 11:55am) as a result of excavation. Once the cofferdam was fully extended to the right bank and all flows were connected through the culvert, sudden undermining of the culvert bedding occurred when large boulder armouring the base of the culvert inlet was dislodged creating a turbid event. Emergency instream works ensued to breach the right side of the cofferdam and direct flows back into the pre-existing channel, while at the same time the left bank cofferdam was reinstated to isolate the active works area. Once this creek was successfully diverted back to the right bank, works were postponed until the following day. During this event WQ remained in exceedance of BCAWQG for approximately one hour.

Culvert installation resumed on October 17th, 2013. The bedding material, culvert armouring, and culvert backfilling were completed in the dry on the left portion of the channel. Once the backfilling and armouring of the culvert were completed water was directed through the newly installed culvert. Water quality was monitored during cofferdam removal which resulted in a temporary exceedance of BCWQG (<30 minutes; 9:45 – 10:15 am). Backfilling of the remaining portion was completed after the watercourse was successfully diverted through the new culvert. No further water quality exceedances were noted. All water quality results are presented in the table below.

Photos:



Photo 1. Culvert installation and cofferdam at Stn. 1+430 (Oct 16, 2013).



Photo 2. Drilling activities at the west heading of the Truckwash Creek FSR realignment (Oct 18, 2013).

Water Quality Results

Date	Time	Sample Location Description*	pH	Turbidity (NTU)	Temperature (°C)
Oct. 16	10:10	DS	-	32.1	-
	10:25	BG	-	5.5	-
	10:35	DS	-	10.0	-
	11:30	DS	-	23.6	-
	11:55	DS	-	10.7	-
	15:00	DS	-	>200	-
	15:15	BG	-	2.8	-
	15:40	DS	-	15.2	-
	16:05	DS	-	7.4	-
Oct. 17	8:30	BG	-	1.82	-
	9:45	DS	-	36.4	-
	10:15	DS	-	7.9	-

* WQ stations were approximately 5 meters upstream (BG) of culvert works (at Stn. 1+430) and approximately 15 meters downstream (DS) of culvert works.

4.1.2 Truckwash Creek Trail Construction

Construction Activities

- Crews completed the construction of a rough trail along the new Truckwash Creek Trail alignment to the left bank abutment of the footbridge to be installed over Truckwash Creek. Hand tools were used to grub and clear a footpath along a surveyed/flagged centerline. Upgrades to rocky sections and steeper sections of the trail also occurred during this reporting period.

Environmental Summary:

- No environmental issues were observed.

Photos:

- No photos of the trail work were taken during this reporting period.

Water Quality Results

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Temperature (°C)
No WQ measurements were recorded during this reporting period. Trail construction activities had no visual effect on WQ.					

4.2 Recommendations

The following recommendations are provided for this reporting period:

- Continue to employ blasting mitigation measures performed during this reporting period as they have been effective at reducing noise levels.
- If blasting activities are to occur within 500m of the identified Mountain Goat UWR after November 1, the IEM recommends that blasting mats be brought to site and be used as the primary mitigation to ensure noise levels are within allowable limits and minimize the potential for construction delays.

4.3 Upcoming Works

The realignment of the Lillooet River FSR and Truckwash Creek Bridge Crossing work is scheduled to continue for the next 3 - 4 weeks. Work will continue on both the east and west headings of the alignment during the next reporting period. Blasting at the west heading and continued bulk excavation at the east heading is expected to occur next week.

Truckwash Creek Trail construction will continue next week. Crews will begin constructing elevated footpaths through wet sections of the trail next week, and will also work to improve steep and/or rocky sections.

5.0 Transmission Line

5.1 Monitoring Results

5.1.1 Segment 1 and 2 Clearing (poles 0 – 40)

Clearing Activities

- No Feller buncher clearing activities occurred during this reporting period.
- Hand falling within the RVMA areas associated with Boulder Creek and Streams 30A, 33A, and 34A occurred this week (Photo 3). Vegetable based bar oil was used in the chainsaws operating within 15m of a watercourse (Photo 4).
- Hand falling occurred on the steep slope above the Lillooet River FSR near 41km for the clear span section between poles 5 & 6. This work required fallers to be harnessed and secured with ropes and temporary road closures in this section of the FSR. No logs or debris entered the Lillooet River which is located adjacent to the FSR in this section.

Environmental Summary:

- IEM was onsite for clearing activities within 30m of suitable Coastal Tailed Frog habitat adjacent to Boulder Creek prior to hand falling. No removal of course woody debris was completed with any type of logging machinery. Vegetable based bar oil was used in the chainsaws and no trees were felled into the stream. No environmental concerns were noted.
- The IEM was onsite and reviewed the clearing prescriptions in each RVMA prior to beginning clearing activities in these areas. No environmental concerns were noted.
- No ESC or WQ issues were observed throughout the active works areas.

Photos:



Photo 3. Results of hand falling within the 30m Boulder Creek Coastal Tailed Frog habitat buffer. The remaining trees will be topped (Oct. 15, 2013).



Photo 4. BioPlus vegetable based chainsaw bar oil used when hand falling with RVMA areas. (Oct. 15, 2013).

Water Quality Results

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Temperature (°C)
No WQ measurements were recorded during this reporting period. Clearing activities had no visual effect on WQ.					

5.2 Recommendations

Prior to initiating clearing activities in segments 4 & 5, the IEM recommends installing a visual barrier to protect the adjacent wetland areas from 31km to 29.5km along the Lillooet River FSR. The IEM will verify that this barrier is installed prior to initiating clearing in these wetland habitat buffer zones.

5.3 Upcoming Works

Transmission line clearing work will continue in Segments 4 & 5 next week following a segment pre-start meeting which is scheduled for October 21st, 2013. No temporary or permanent access road construction or transmission line infrastructure construction will occur as part of the currently scheduled clearing activities. Clearing within RVMA's will continue next week, pre-work reviews of clearing prescriptions will continue to be completed for each RVMA prior to clearing.

6.0 Wildlife Sightings Report, Period

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) and will submitted to the IEM

on a weekly basis. Wildlife Observation forms will be summarized on a monthly basis and appended to the first WEMR of the following month. 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

7.0 Environmental Issues Tracking Matrix (ITM)

7.1 Hydroelectric Facilities (ULRHEF & BDRHEF)

ITM Tracking Legend:

Work Item Open
Work Item Complete
Issue Closed

Issue Tracking		Environmental Issue		Mitigation Measures			
ID No.	Status	Location	Issue Description	Action Taken/Recommended	Date of Identification	Targeted Completion Date	Date Completed
<i>No outstanding environmental issues.</i>							

7.2 Transmission Line

ITM Tracking Legend:

Work Item Open
Work Item Complete
Issue Closed

Issue Tracking		Environmental Issue		Mitigation Measures			
ID No.	Status	Location	Issue Description	Action Taken/Recommended	Date of Identification	Targeted Completion Date	Date Completed
<i>No outstanding environmental issues.</i>							