Upper Lillooet Hydro Project

Weekly Environmental Monitoring Report #13

Reporting Period: December 8th – December 14th, 2013

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 2)
Fisheries Act Subsection 35(2)(b) Authorization No. 09-HPAC-PA2-00303

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

Licence of Occupation (ULRHEF #232384) File No. 2409871

Licence of Occupation (BDRHEF #232386) File No. 2409998

Licence of Occupation (TX Line #2423386) File No. 2410654

Occupant Licence to Cut (ULRHEF Amendments 1 & 2) No. L49717

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

Occupant Licence to Cut (Construction Camp) No. L49698

Occupant Licence to Cut (BDRHEF - Intake, Powerhouse, Roads and Infrastructure) No. L49816

General Wildlife Measure Exemption Approval Letter (TX Line) File No. 78700-35/06 UWR and 39585-20 WHA

Road Use Permit No. 6123-13-02

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ACRONYMS:

BCEAO British Columbia Environmental Assessment Office

BCWQG British Columbia Water Quality Guidelines

BDRHEF Boulder Creek Hydroelectric Facility

BG Background

BKL Consultants Ltd.

CRT-EBC Construction Inc.

DFO Fisheries and Oceans Canada

DS Downstream

Ecofish Ecofish Research Ltd.
Ecologic Ecologic Consulting

ESC Erosion and Sediment Control

FSR Forest Service Road

GWR Mountain Goat Winter Range Hedberg and Associates Ltd.

IEM Independent Environmental Monitor Innergex Renewable Energy Inc.

ITM Issue Tracking Matrix LTC Leave to Construct

MFLNRO Ministry of Forests, Lands and Natural Resource Operations

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:

		IEM Team	Weather	Monitoring Locations & Key On-site Environmental
Day	Date	Personnel	Conditions	Information
				ULRHEF & BDRHEF Site Investigation
				Drilling completed at the south (right bank) of the
				ULRHEF intake and equipment mobilized to the
Sunday	Dec 8	AA, AS, TH	Clear skies	ULRHEF Powerhouse
				Drilling completed at ULRHEF Powerhouse
				ULRHEF & BDRHEF Construction Camp
				Grubbing and grading continued
				ULRHEF & BDRHEF Site Investigation
				Mobilization to the ULRHEF intake to drill a final
				borehole on the access road north of the intake
			0	location
Monday	Dec 9	AA, AS, TH	Clear skies	ULRHEF & BDRHEF Construction Camp
				Grubbing and grading continued Graduation of a pain house house house.
				 Construction of a noise barrier berm began TX Line – Segment 1-5
				Stream 27A RVMA tree topping completed ULRHEF & BDRHEF Site Investigation
				Drilling on the access road north of the ULRHEF
				intake location
Tuesday	Dec 10	AS, DA,TH	Clear skies	ULRHEF & BDRHEF Construction Camp
				Grubbing and grading continued
				Construction of a noise barrier berm continued
				ULRHEF & BDRHEF Site Investigation
				Drilling completed on the intake access road north of
				the ULRHEF intake
Modernodov	Dag 11	AC TH VD	Classisias	All equipment demobilized to the laydown at 37 km of
Wednesday	Dec 11	AS,TH, VD	Clear skies	the Lillooet River FSR
				ULRHEF & BDRHEF Construction Camp
				Grubbing and grading continued
				Construction of a noise barrier berm continued
				ULRHEF & BDRHEF Construction Camp
				Grubbing and grading continued
Thursday	Dec 12	TH	Snow	Construction of a noise barrier berm continued
				TX Line – Segment 2
				Stream 30A RVMA tree topping completed
المناطعين	Doc 40			ULRHEF & BDRHEF Construction Camp
Friday	Dec 13	-	-	Grubbing and grading continued Genetication of a point house positioned.
				Construction of a noise barrier berm continued
Saturday	Dec 14	_		 ULRHEF & BDRHEF Construction Camp Grubbing and grading continued
Saturday	Dec 14	_	_	
				Construction of a noise barrier berm continued

IEM Team Personnel: AA – Anthony Andrews; AS – Anne Sutherland; DA – Danita Abraham; TH – Tom Hicks; VD – Vanessa Dan



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.
Dec. 12	Pre-work meeting	Mumleqs, SES	Reviewed tree topping prescription for the Stream 30A RVMA.	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/Archeology Concern	Construction/Timing Restrictions & Mitigations
ULRHEF	Lillooet River FSR realignment at Truckwash Creek & ULREF Intake	Mountain Goat Winter Range Habitat (UL 11, UL 19 and Migration Corridor)	Mountain Goat monitoring activities were performed during this reporting period as construction activities at the ULRHEF intake were performed within 500m of Mountain Goat critical winter habitats (UL 11, UL 19), or within 200m of the Migration Corridor. Noise monitoring equipment was installed on December 2 nd to monitor background noise levels and exceedances of the 75dbA noise level maximum resulting from construction/investigative drilling activities. No adaptive noise mitigation strategies have been implemented or are recommended at this time.



4.0 Upper Lillooet River Hydroelectric Facility

4.1 Monitoring Results

4.1.1 Intake and Powerhouse Site Investigations

Construction Activities

- Borehole drilling within the powerhouse footprint was completed during this monitoring period (Photo 1).
- Two boreholes were drilled and logged near the ULRHEF intake during this reporting period. The first was completed on the south bank of the Lillooet River at the future intake location. The second was completed on the access road immediate north of the future intake location (<u>Photo 2</u>).

Environmental Summary:

- No tree falling or ground disturbance within 100m of the Lillooet River was completed during this monitoring period.
- Water required for drilling activities at the powerhouse and intake was extracted from
 the production water well at the construction camp. The water was towed to the drill
 sites in small tank trailers by pick-up trucks. The volumes of water used during
 drilling activities did not create detectable amounts of sediment laden runoff and
 quickly froze or infiltrated to ground in close proximity to the boreholes. No water
 quality concerns were noted.
- Drilling activities at the ULRHEF powerhouse were completed at a distance greater than 50m from the identified archeology site in the vicinity of the future powerhouse location; therefore, an archeological monitor was not required or present onsite during drilling activities. No disturbance to the archeology site was observed.
- The noise monitoring equipment installed on December 2, 2013 was removed on December 11, following completion of all snow plowing and work activities within 500m of UWR habitats (UL11, UL19, and Migration Corridor). The equipment was used to monitor background noise levels and potential exceedances of the 75dbA noise level maximum resulting from construction/investigative drilling activities in the vicinity of the ULRHEF intake. Noise monitoring data will be summarized in the forthcoming report from BKL noise monitoring consultants. No adaptive noise mitigation strategies have been implemented at this time.



Photos:



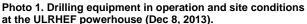




Photo 2. Borehole drilling on the access road north of the ULRHEF intake. (Dec 9, 2013).

Water Quality Results

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

4.1.2 Construction Camp

Clearing Activities

- Excavators continued to pile slash and fallen trees at the future construction camp location this week. All works were conducted within the clearing boundary.
- Grubbing and grading of the construction camp continued during this monitoring period (<u>Photo 3</u>).
- Organic soils stripped during the grubbing works were temporarily piled in rows, and
 once the organic material was sorted from large rocks, it was used to construct a
 visual/auditory berm. The berm was compacted in lifts of material with a dozer and
 by running over the surface with rock trucks. This berm will separate the future camp
 location from the works yard location (Photo 4).

Environmental Summary:

No environmental concerns were noted.



Photos:

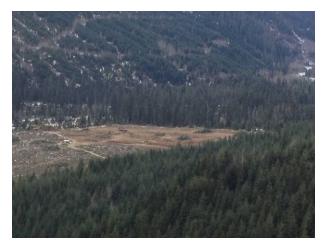


Photo 3. Overview of grubbing activities completed at the future construction camp location (Dec 10, 2013).



Photo 4. Construction of the visual/auditory berm at the future construction camp location. (Dec 11, 2013).

Water Quality Results

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

4.2 Recommendations

No recommendations are provided for this reporting period.

4.3 Upcoming Works

Grubbing, grading, and construction of a visual/auditory berm will continue at the future construction camp location next week. Once snowfall begins to impact work activities, CRT-EBC plans to demobilize all construction equipment from site and suspend works for the winter. At the latest, CRT-EBC plans to demobilize from site by December 19th, 2013.

5.0 Transmission Line

5.1 Monitoring Results

5.1.1 **Segments 1 – 6**

Clearing Activities

 Tree topping within the Stream 27A RVMA and the Stream 30A RVMA was completed during this reporting period (Photo 6 & 7).



Environmental Summary:

 A review of the clearing prescription was performed prior to tree topping within the Stream 30A RVMA. Fallers used bio-degradable bar/chain oil when working within 30m of Stream 30A. No environmental concerns were noted during topping activities.

Photos:



Photo 6. Conditions of Stream 27A following removal of all slash and debris from within the channel, which was frozen over on Dec 9, 2013.



Photo 7. Conditions on the Stream 30A RVMA following completion of tree topping activities (Dec 12, 2013).

Water Quality Results

Date	Time	Sample Location Description	рН	Turbidity (NTU)	Temperature (°C)	
	No WQ measurements were recorded during this reporting period.					

5.2 Recommendations

No recommendations are provided for transmission line activities during this reporting period.

5.3 Upcoming Works

No clearing or TX line works are scheduled to occur during the next monitoring period. Works have been suspended until further notice.

6.0 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) 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 Mountain Goat Monitoring Program

As of December 2nd, the IEM reinitiated a Mountain Goat Monitoring program as works resumed near the ULRHEF intake. The IEM or designate was on site to monitor Mountain Goat activity within 500 m of clearing/drilling activities at the future ULRHEF intake location. Mountain Goats will be monitored from:

 Keyhole Falls viewing the south side u-2-002 UL11 – MG-OBS02 (10U 466593 5613988)

Monitoring effort will occur between sunrise and sunset. Construction activities will 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 drilling activities and no work stoppages were required.

Please refer to the attached Mountain Goat Monitoring Daily Observation Forms for a summary of observations from this reporting period.



8.0 Environmental Issues Tracking Matrix (ITM)

8.1 Hydroelectric Facilities (ULRHEF & BDRHEF)

ITN	M Tracking	g Legend:	Work Item Open Work Item Complete Issue Closed				
Issue	Tracking		Environmental Issue	Mitigatio	on Measures		
ID No.	Status	Location	Issue Description	Action Taken/Recommended	Date of Identification	Targeted/ Completion Date	Date Completed
	No outstanding environmental issues.						

8.2 Transmission Line

ITIV	Tracking Lo	egend:	Work Item Open Work Item Complete Issue Closed				
Issue Tracking Environr		vironmental Issue	Miti	gation Measure	S		
ID No.	Status	Location	Issue Description	Action Taken/Recommended	Date of Identification	Targeted Completion Date	Date Completed
	No outstanding environmental issues.						

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): anne Sutherland, Anthony Andrews
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Date (YYYY-MM-DD):

2013-12-08	
2013 12 00	



106-185 forester street, north vancouver, bc v7h 2m9 office tel 987.5588 fax 987.7740

Weather (cloud cover, precipitation and temperature): 50% cloud cover, partly sunny, 8 - 11 C

Please submit Mountain Goat Daily Observation Form in person to a representative of Sartori Environmental Services (Tom Hicks or Stephen Sims) or by email to steve@sartorienv.com following each day of monitoring.

Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates (approximate center of observation area)	Daily Start Time (24hr clock)	Daily End Time (24hr clock)
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	-	-
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	08h55	12h20
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	-	-

	Daily form	1	of	1
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(in loca	Site ndicate if ntion other n OBS site)	Time (use 24hr clock)	UTM Coordinates or Waypoint (10U)	Observed	other siam	# of Animals	Age (if known - refer to attached info sheet)	Sex (if known - refer to attached info sheet)	Description of Activities (feeding, moving, etc.)	Comments (habitat, snow conditions, etc.)	Photo #s
Mo	G-OBS02	09h30	46843.06 m E 5613942.09 m N	Mountain Goat	visual	1	Adult	u/k	Adult goat on its own, had a clean looking goat, therefore maybe a female. Was feeding along the upper slope then went into the woods.	Drillers had moved equipment from the west side of Keyhole out of the area around 08h30.	
Mo	G-OBS02	12h00	-	-	•	-	-	1	•	Loader working in the area in the morning, but no noticeable sound at the monitoring station. No other goats seen in the morning.	

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Anne Sutherland, Anthony Andrews	
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Date (YYYY-MM-DD):	2
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106-185 forester street, north vancouver, bc v7h 2m9 office tel 987.5588 fax 987.7740

Weather (cloud cover, precipitation and temperature): 40% cloud, sun, -8 C

Please submit **Mountain Goat Daily Observation Form** in person to a representative of Sartori Environmental Services (**Tom Hicks** or **Stephen Sims**) or by email to steve@sartorienv.com following each day of monitoring.

Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates (approximate center of observation area)	Daily Start Time (24hr clock)	Daily End Time (24hr clock)
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	-	-
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	09H30	16H30
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	-	-

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Observation Site (indicate if location other than OBS site)	Time (use 24hr clock)	1 (1()(1)	Observed	other sian)	# of	attacnea	Sex (if known - refer to attached info sheet)	Description of Activities (feeding, moving, etc.)	Comments (habitat, snow conditions, etc.)	Photo #s
MG-OBS02	09h30- 12h30	-	-	•	-	1	-		Drilling at keyhole and construction noise was audible at the monitoring station. No goats observed at the monitoring station.	
MG-OBS02	13h05- 14h00	-	-	·	-	-	-	-	Period of Audible construction noise. No goats observed.	yes
MG-OBS02	15h55	-	-	-		-	-	-	Audible drilling noises. Still no goats observed.	

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Anne S	itherland, Danita Abraham
Goat Monitor's Name(s): Anne S	ıtherland, Danita Abraham



106-185 forester street, north vancouver, bc v7h 2m9 office tel 987.5588 fax 987.7740

Weather (*cloud cover,* precipitation *and temperature*): 70% low cloud, no precip., - 8 C

Please submit **Mountain Goat Daily Observation Form** in person to a representative of Sartori Environmental Services (**Tom Hicks** or **Stephen Sims**) or by email to steve@sartorienv.com following each day of monitoring.

Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates (approximate center of observation area)	Daily Start Time (24hr clock)	Daily End Time (24hr clock)
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	-	-
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	08h55	16h30
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	-	-

Daily form	1	of	1
#	'	0.	

Observation Site (indicate if location other than OBS site)	Time (use 24hr clock)	1 (1()(1)	Observed	other sian)	# of	Age (if known - refer to attached info sheet)	Sex (if known - refer to attached info sheet)	moving, etc.)	Comments (habitat, snow conditions, etc.)	Photo #s
MG-OBS02	09h40	466803 5613931	Mountain Goat	visual	2	adult, kid	female, u/k	moving around and feeding, both adults and the kid Same female with broken horn.	Audible drilling construction noises while they were moving around and feeding	yes
MG-OBS02	10h35	466893 5613861	Mountain Goat	visual	2	adult, kid	female, u/k	Pawing, feeding, moving.	no audible construction.	
MG-OBS02	12h00 to 14h00	-		-	-	-	-	goats behind trees and no longer visible.	drilling sounds not audible.	

UPPER LILLOOET HYDRO PROJECT

Goat Monitor's Name(s): Anne Sutherland, Vanessa Dan

Date (YYYY-MM-DD):



106-185 forester street, north vancouver, bc v7h 2m9 office tel 987.5588 fax 987.7740

Weather (cloud cover, precipitation and temperature): overcast, snowing lightly, -4 C

Please submit **Mountain Goat Daily Observation Form** in person to a representative of Sartori Environmental Services (**Tom Hicks** or **Stephen Sims**) or by email to steve@sartorienv.com following each day of monitoring.

Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates (approximate center of observation area)	Daily Start Time (24hr clock)	Daily End Time (24hr clock)
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	-	-
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	08h55	15h00
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	-	-

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Observation Site (indicate if location other than OBS site)	Time (use 24hr clock)	UTM Coordinates or Waypoint (10U)	Observed	otrier siari)	# of Animals	Age (if known - refer to attached info sheet)	Sex (if known - refer to attached info sheet)	Description of Activities (feeding, moving, etc.)	Comments (habitat, snow conditions, etc.)	Photo #s
MB-OBS02	11h45	466700 5614004	mountain goat	visual	2	Adult Kid	female, u/k	May have been resting in forest above our monitoring station. Moving out onto scree slope to halfway up and then walked across.	No audible drilling noise at the time they appeared on the slope, but we moved our location and they may have reacted to that. The nanny keep stopping and turing to watch	lots
MB-OBS02	12h00	466776 5613978	mountain goat	visual	2	п	:	Nanny was leading kid away from where she could see us. Nanny walked up to a safe spot and waited for kid to catch up. Stayed there for a while,	licking rocks and watching us. Kid moved forward to look at us and then nanny walked in front to block her from us.	
MB-OBS02	13h05	466800 5613954	mountain goat	visual	2	п	п	Both goats moved slowly along the trail eating and licking, not paying to much attention to us. They must have felt comfortable with distance between us.	Tracks went into the woods above our monitoring station. Possible they take cover in this location beside the scree slope	