

Upper Lillooet Hydro Project

Weekly Environmental Monitoring Report #18

Reporting Period: April 20th – April 26th, 2014

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 3)
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 (BDRHEF – km 38 laydown) No. L49698*

Occupant Licence to Cut (BDRHEF& Construction Camp Amendment 1) No. L49816

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

*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	BKL Consultants Ltd.
CRT-ebc	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	Hedberg and Associates Ltd.
IEM	Independent Environmental Monitor
Innergex	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
VC	Valued Component
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 On-site Environmental Information
Sunday	Apr 20	VD	Sun and Cloud	38km Laydown <ul style="list-style-type: none"> Grading and benching continued at the 38km laydown
Monday	Apr 21	VD	Overcast/light rain	38km Laydown <ul style="list-style-type: none"> Grading and benching continued at the 38km laydown
Tuesday	Apr 22	TH	Sun and Cloud	38km Laydown <ul style="list-style-type: none"> Grading and benching continued at the 38km laydown Construction Camp <ul style="list-style-type: none"> Hand falling of the Construction Camp area complete Boulder Intake Access Road <ul style="list-style-type: none"> Hand falling of the Boulder intake access road continued
Wednesday	Apr 23	TH	Sun and Cloud	38km Laydown <ul style="list-style-type: none"> Grading and benching continued at the 38km laydown Construction Camp <ul style="list-style-type: none"> Pre-activity meeting for clearing and grubbing of the camp area Boulder Intake Access Road <ul style="list-style-type: none"> Hand falling of the Boulder intake access road began
Thursday	Apr 24	TH,MS	Overcast/light rain	38km Laydown <ul style="list-style-type: none"> Grading and benching continued at the 38km laydown Construction Camp <ul style="list-style-type: none"> Grubbing of the camp and sorting/stockpiling of merchantable timber Boulder Powerhouse and Intake Access Road <ul style="list-style-type: none"> Pre-activity meeting for the stripping and grubbing of the Boulder Powerhouse footprint and spoil area Hand falling of the Boulder intake access road continued
Friday	Apr 25	TH,MS	Sun and Cloud	38km Laydown <ul style="list-style-type: none"> Grading and benching continued at the 38km laydown Construction Camp <ul style="list-style-type: none"> Grubbing of the camp and sorting/stockpiling of merchantable timber Boulder Powerhouse and Intake Access Road <ul style="list-style-type: none"> Hand falling of the Boulder intake access road continued Ditching and water management along the Powerhouse access road

Day	Date	IEM Team Personnel	Weather Conditions	Monitoring Locations & Key On-site Environmental Information
Saturday	Apr 26	MS	Overcast/ light rain	38km Laydown <ul style="list-style-type: none"> Grading and benching continued at the 38km laydown Construction Camp <ul style="list-style-type: none"> Grubbing of the camp and sorting/stockpiling of merchantable timber Boulder Powerhouse <ul style="list-style-type: none"> Ditching and water management along the Powerhouse access road

IEM Team Personnel: MS – Mandala Smulders; 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.
April 23	<i>Pre-work Meeting</i>	CRT- ebc, SES, Innergex, Hedberg	<ul style="list-style-type: none"> Reviewed the construction camp clearing and grubbing work plan, highlighting merchantable timber and woody debris management. 	N/A
April 24	<i>Pre-work Meeting</i>	CRT- ebc, SES, Innergex,	<ul style="list-style-type: none"> Reviewed the Boulder powerhouse work plan, discussed water management plan, discussed environmental constraints/ boundary limits, and discussed need for CTF precautionary amphibian sweep. 	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
<i>BDRHEF intake access road</i>	<i>At 3.8km of BDRHEF intake access road</i>	<i>Mountain Goat UWR and Wolverine den emergence period</i>	<i>Access to BDRHEF intake must be gated at least 500 m from the original UWR u-2-002 UL 12 to restrict motorized use within the UWR, unless otherwise directed by FLNR. A no-entry zone will be created and managed within 500 m of GWR adjacent to construction areas during winter months (November 1 – April 30). Construction activities will be suspended at the BDRHEF intake from March 1 – April 30 (Wolverine den emergence period).</i>

Component	Location	Wildlife/Archeology Concern	Construction/Timing Restrictions & Mitigations
<p><i>Lillooet River FSR; ULRHEF intake access; FSR realignment at Truckwash Creek</i></p>	<p><i>Access roads above ULRHEF Powerhouse to the ULRHEF intake; including FSR realignment at Truckwash Creek</i></p>	<p><i>Mountain Goat UWR and Wolverine den emergence period</i></p>	<p><i>All construction-related activities above the Upper Lillooet River HEF powerhouse must be suspended from March 1 – April 30 (the period associated with wolverine den emergence). Additional mitigations were proposed by Ecofish Research Ltd. and conditionally approved by the IEM to protect VCs during preliminary snow removal activities during the last monitoring period (April 15th – April 19th). No activity occurred above the ULR powerhouse during this monitoring period. Additional information is provided in Section 6.0.</i></p> <p><i>Construction noise must be minimized within 500 m of legally established UWR during winter (November 1 – April 30) to the satisfaction of the IEM or designate.</i></p> <p><i>If a goat is observed within 500 m 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.</i></p>

4.0 Boulder Creek Hydroelectric Facilities

4.1 Monitoring Results

4.1.1 Active Construction Areas

[38km Laydown Area](#)

- CRT-ebc continued grading of the laydown area to provide a flat surface for staging equipment and materials. No water quality concerns were noted.

[Construction Camp](#)

- Hand-falling of trees within the Construction Camp (middle) location (*EAC amendment #3*) was completed this week. Boundary flagging was visible and all hand falling remained within the clearing limits. Sorting/stockpiling of merchantable timber began following a pre-work activity meeting (April 23rd) and prior to stripping and grubbing activities.

[BDRHEF Intake Access Road](#)

- Hand-falling of trees occurred along the access road alignment up to 3.8km of the pre-existing access road. Access beyond 3.8km is restricted until May 1st due to Wolverine and Mountain Goat sensitivity and the boundary was clearly marked in the

field. All trees falling was completed within approved OLTC boundaries and outside of the 500 m UWR buffer and identified sensitive Wolverine den emergence area.

BDRHEF Powerhouse

- A pre-work meeting was held on April 24th to review the work plan. Work began by installing road side drainage ditches following the methods described in the work plan. All site water was directed to newly installed ditches and conveyed through temporary road culverts. All powerhouse site drainages infiltrate to ground prior to connecting to Boulder Creek or its tributaries.

Environmental Summary:

- Pre-work meeting were conducted for the stripping and grubbing of the Construction Camp and the Powerhouse work area. Work plans were reviewed onsite with each site foreman and Superintendent and work methods were discussed.
- Prior to beginning work at the Powerhouse, Ecofish conducted a precautionary CTF sweep concentrating on wet areas and accumulations of woody debris. No CTF were observed during the precautionary sweep.
- Water quality sampling occurred in Boulder Creek during active powerhouse access road culvert installation and downstream infiltration areas were monitored. No surface water connection to Boulder Creek or its tributaries was located and no water quality concerns were noted.

Photos:



Photo 1. Stripping and grubbing of the Construction Camp work area. (April 25, 2013).



Photo 2. Road side drainage installation at the BDRHEF powerhouse location. (April 26, 2013).

Water Quality Results

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Temperature (°C)
Apr 24	10:47	Upstream - FSR bridge (Boulder Crk)	-	0.71	-
Apr 24	10:48	Downstream - FSR bridge (Boulder Crk)	-	0.79	-

4.2 Recommendations

Surface water management on the FSR should continue throughout the spring melt period to protect water quality in adjacent watercourses by directing sediment laden water to adjacent vegetated areas and/or road side ditches.

4.3 Upcoming Works

Snow depth monitoring will continue regularly until threshold levels are recorded. Clearing activity is scheduled to continue along the BDRHEF intake access road to 3.8km. Stripping and grubbing at both the Construction Camp location and the BDRHEF powerhouse is scheduled to continue next week. No transmission line construction activities are scheduled to occur next week.

5.0 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

6.0 Wolverine Den Emergence Period & Mountain Goat Monitoring Program

Ecofish was consulted in early March 2014 regarding the potential for CRT-ebc to begin snow removal activities above the ULRHEF powerhouse between March 1st and April 30th, the period associated with wolverine den emergence. Rational was provided by Ecofish and approved by the IEM prior to proceeding with preliminary snow removal

prior to May 1st. Further detail can be found in the previous weekly report (#17). No activities occurred above the ULRHEF Powerhouse during this monitoring period.

Snow depths measured during this reporting period did not result in the implementation of the 2 week spring shutdown as detailed in the Mountain Goat Management Plan.

Noise levels were recorded during snow plowing activities that occurred in the previous reporting period within 500 m of legally established UWR. An analysis of the recorded noise level data was performed by BKL Consultants Ltd., and showed three instances where noise levels peaked above 70db. All three instances were the result of members of the public walking and talking around the noise monitoring equipment and were not caused by construction related activity. A data summary excel spreadsheet is appended to this report.

Please refer to the attached and snow depth monitoring forms for a summary of snow depth observations from this reporting period.

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>							

Table C2

Phase 2=>BKL2 - Lower Truckwash

Location Coordinates:

50 40' 16.91 N

123 27' 11.26 W

Statistics of Measurements

with a Fast Time Constant

Year	Date	Start Time (24 hr)	End Time (24 hr)	Time Elapsed (hh:mm:ss)	70 dBA Exceeded (fast)			75 dBA Exceeded (fast)		
					Y/N	Number of Occurances	Times	Y/N	Number of Occurances	Times
2014	15-Apr	4/15/14 11:43	4/16/14 0:00	12:16:40	N					
2014	16-Apr	4/16/14 0:00	4/16/14 23:59	23:59:31	N					
2014	17-Apr	4/17/14 0:00	4/17/14 11:44	11:44:10	N					
2014	17-Apr	4/17/14 11:45	4/17/14 12:44	0:59:44	N					
2014	17-Apr	4/17/14 12:47	4/17/14 23:59	11:12:38	N					
2014	18-Apr	4/18/14 0:00	4/19/14 0:00	23:59:32	Y	1		Y	1	9:53
2014	19-Apr	4/19/14 0:00	4/20/14 0:00	23:59:32	Y	1		N		
2014	20-Apr	4/20/14 0:00	4/21/14 0:00	23:59:32	Y	1		Y	1	20:46
2014	21-Apr	4/21/14 0:00	4/22/14 0:00	23:59:32	N					
2014	22-Apr	4/22/14 0:00	4/22/14 12:21	12:21:05	N					

- STAFF checking equipment
- CONSTRUCTION vehicles moving, rattling
- BLAST obvious blast
- DRILLING drilling noise
- OTHER planes (typically), non-staff humans, environmental, undiscernable

Two-Week Mountain Goat Shutdown Form (Spring)

UPPER LILLOOET HYDRO PROJECT



Monitor's Name(s):

Date (YYYY-MM-DD): Time (24hr Clock):

106-185 forester street, north vancouver, bc v7h 2m9
office tel 604.987.5588 fax 604.987.7740

Weather (cloud cover, precipitation and temperature):

Spring Shutdown

Trigger – All drilling and drilling associated activities at the Upper Lillooet River HEF downstream portal near Truckwash Creek will cease for a minimum of two consecutive week periods when the snow begins to recede to 250 m above the portal drill site in spring.

Criteria – An average snow depth of <20 cm at the 5 road transects located above the new Truckwash Creek bridge (n=15, i.e. 3 per transect) and/or an average snow depth <10 cm at the 5 road transects located near the lower Truckwash Creek crossing (n=15, i.e. 3 per transect).

Upstream work at ULR HEF – Construction works at the Upper Lillooet River HEF intake will cease

Please fill-out and complete calculations of **Two-Week Mountain Goat Shutdown Form** on a daily basis (ideally between the hours of **12:00 to 17:00**). If the above criteria are exceeded, please contact a representative of Sartori Environmental Services (**Tom Hicks** or **Stephen Sims**) by radio, satellite phone or in person **AS SOON AS POSSIBLE**. In the event you are unable to contact a representative of Sartori Environmental Services, please contact the INNERGEX office by satellite phone at 604.894.6862 or Liz Scroggins on her mobile phone at 604.966.4594.

Upper Road Sites			
<i>(5 transects, each site 10m apart - 3 samples per site across road)</i>			
Snow Level Transects	Sample 1 Depth (cm)	Sample 2 Depth (cm)	Sample 3 Depth (cm)
Upper-ROAD01	98	88	84
Upper-ROAD02	85	86	93
Upper-ROAD03	102	87	91
Upper-ROAD04	99	83	81
Upper-ROAD05	100	93	93
Total of All Measurements (cm)			1363
Average Snow Depth (cm)			91
* If average snow level depth is < 20cm at upper road sites, please contact a representative of Sartori Environmental Services ASAP .			

Lower Road Sites			
<i>(5 transects, each site 10m apart - 3 samples per site across road)</i>			
Snow Level Transects	Sample 1 Depth (cm)	Sample 2 Depth (cm)	Sample 3 Depth (cm)
Lower-ROAD01	61	68	66
Lower-ROAD02	61	59	62
Lower-ROAD03	71	55	58
Lower-ROAD04	61	56	55
Lower-ROAD05	57	56	54
Total of All Measurements (cm)			900
Average Snow Depth (cm)			60
* If average snow level depth is < 10cm at lower road sites, please contact a representative of Sartori Environmental Services ASAP .			

In the event snow levels along the road cannot be measured due to recent traffic or snow plowing, a nearby spur road or clearing at similar elevation should be located and used for measurements.

Please indicate the approximate location of road monitoring sites:

Lower site = clearing along FSR ~100m from truckwash

Two-Week Mountain Goat Shutdown Form (Spring)

UPPER LILLOOET HYDRO PROJECT



Monitor's Name(s):

Date (YYYY-MM-DD): Time (24hr Clock):

106-185 forester street, north vancouver, bc v7h 2m9
office tel 604.987.5588 fax 604.987.7740

Weather (cloud cover, precipitation and temperature):

Spring Shutdown

Trigger – All drilling and drilling associated activities at the Upper Lillooet River HEF downstream portal near Truckwash Creek will cease for a minimum of two consecutive week periods when the snow begins to recede to 250 m above the portal drill site in spring.

Criteria – An average snow depth of <20 cm at the 5 road transects located above the new Truckwash Creek bridge (n=15, i.e. 3 per transect) and/or an average snow depth <10 cm at the 5 road transects located near the lower Truckwash Creek crossing (n=15, i.e. 3 per transect).

Upstream work at ULR HEF – Construction works at the Upper Lillooet River HEF intake will cease

Please fill-out and complete calculations of **Two-Week Mountain Goat Shutdown Form** on a daily basis (ideally between the hours of **12:00 to 17:00**). If the above criteria are exceeded, please contact a representative of Sartori Environmental Services (**Tom Hicks** or **Stephen Sims**) by radio, satellite phone or in person **AS SOON AS POSSIBLE**. In the event you are unable to contact a representative of Sartori Environmental Services, please contact the INNERGEX office by satellite phone at 604.894.6862 or Liz Scroggins on her mobile phone at 604.966.4594.

Upper Road Sites			
<i>(5 transects, each site 10m apart - 3 samples per site across road)</i>			
Snow Level Transects	Sample 1 Depth (cm)	Sample 2 Depth (cm)	Sample 3 Depth (cm)
Upper-ROAD01	94	96	100
Upper-ROAD02	98	97	97
Upper-ROAD03	97	92	98
Upper-ROAD04	95	89	88
Upper-ROAD05	65	90	89
Total of All Measurements (cm)			1385
Average Snow Depth (cm)			92.3
* If average snow level depth is < 20cm at upper road sites, please contact a representative of Sartori Environmental Services ASAP .			

Lower Road Sites			
<i>(5 transects, each site 10m apart - 3 samples per site across road)</i>			
Snow Level Transects	Sample 1 Depth (cm)	Sample 2 Depth (cm)	Sample 3 Depth (cm)
Lower-ROAD01	70	72	73
Lower-ROAD02	79	72	68
Lower-ROAD03	60	80	77
Lower-ROAD04	60	60	78
Lower-ROAD05	55	64	55
Total of All Measurements (cm)			1023
Average Snow Depth (cm)			68.2
* If average snow level depth is < 10cm at lower road sites, please contact a representative of Sartori Environmental Services ASAP .			

In the event snow levels along the road cannot be measured due to recent traffic or snow plowing, a nearby spur road or clearing at similar elevation should be located and used for measurements.

Please indicate the approximate location of road monitoring sites:

43.5 km and 44.5km

Two-Week Mountain Goat Shutdown Form (Spring)

UPPER LILLOOET HYDRO PROJECT



Monitor's Name(s):

Date (YYYY-MM-DD): Time (24hr Clock):

106-185 forester street, north vancouver, bc v7h 2m9
office tel 604.987.5588 fax 604.987.7740

Weather (cloud cover, precipitation and temperature):

Spring Shutdown

Trigger – All drilling and drilling associated activities at the Upper Lillooet River HEF downstream portal near Truckwash Creek will cease for a minimum of two consecutive week periods when the snow begins to recede to 250 m above the portal drill site in spring.

Criteria – An average snow depth of <20 cm at the 5 road transects located above the new Truckwash Creek bridge (n=15, i.e. 3 per transect) and/or an average snow depth <10 cm at the 5 road transects located near the lower Truckwash Creek crossing (n=15, i.e. 3 per transect).

Upstream work at ULR HEF – Construction works at the Upper Lillooet River HEF intake will cease

Please fill-out and complete calculations of **Two-Week Mountain Goat Shutdown Form** on a daily basis (ideally between the hours of **12:00 to 17:00**). If the above criteria are exceeded, please contact a representative of Sartori Environmental Services (**Tom Hicks** or **Stephen Sims**) by radio, satellite phone or in person **AS SOON AS POSSIBLE**. In the event you are unable to contact a representative of Sartori Environmental Services, please contact the INNERGEX office by satellite phone at 604.894.6862 or Liz Scroggins on her mobile phone at 604.966.4594.

Upper Road Sites <i>(5 transects, each site 10m apart - 3 samples per site across road)</i>			
Snow Level Transects	Sample 1 Depth (cm)	Sample 2 Depth (cm)	Sample 3 Depth (cm)
Upper-ROAD01	88	77	90
Upper-ROAD02	100	80	89
Upper-ROAD03	93	85	90
Upper-ROAD04	89	89	88
Upper-ROAD05	98	88	90
Total of All Measurements (cm)			1334
Average Snow Depth (cm)			88.9
* If average snow level depth is < 20cm at upper road sites, please contact a representative of Sartori Environmental Services ASAP .			

Lower Road Sites <i>(5 transects, each site 10m apart - 3 samples per site across road)</i>			
Snow Level Transects	Sample 1 Depth (cm)	Sample 2 Depth (cm)	Sample 3 Depth (cm)
Lower-ROAD01	59	58	55
Lower-ROAD02	57	48	44
Lower-ROAD03	74	56	47
Lower-ROAD04	75	49	65
Lower-ROAD05	44	44	57
Total of All Measurements (cm)			832
Average Snow Depth (cm)			55.5
* If average snow level depth is < 10cm at lower road sites, please contact a representative of Sartori Environmental Services ASAP .			

In the event snow levels along the road cannot be measured due to recent traffic or snow plowing, a nearby spur road or clearing at similar elevation should be located and used for measurements.

Please indicate the approximate location of road monitoring sites:

43km lower and 43.5 upper