



Upper Lillooet Hydro Project

Weekly Environmental Monitoring Report #22

Reporting Period: May 18th – May 24th, 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)

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Owner Construction Permits and Approvals

*Environmental Assessment Certificate No.E13-01 (Amendment 1, 2, 3)
Fisheries Act Subsection 35(2)(b) Authorization No. 09-HPAC-PA2-00303
Letter of Advice for the Transmission Line No.09-HPAC0-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
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 Amendments 1, 2, 3) No. L49717
Occupant Licence to Cut (BDRHEF – km 38 laydown) No. L49698
Occupant Licence to Cut (BDRHEF Amendments 1, 2) No. L49816
Occupant Licence to Cut (TX Line Amendment 1) No. L49697*

*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
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*

Contractor Construction Permits and Approvals

*Magazine Licence File No. UL76018
Section 8 Approval – Short Term Use of Water File (Lillooet River and Tributaries) No.A2006123
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*

ACRONYMS:

AMBNS	Active Migratory Bird Nesting Survey
ASMP	Archaeological Sites Management Plan
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
EIR	Environmental Incident Report
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	Environmental Issue Tracking Matrix
LTC	Leave to Construct
MFLNRO	Ministry of Forests, Lands and Natural Resource Operations
MOE	Ministry of Environment
NCD	Non Classified Drainage
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:

Date	IEM Team Personnel	Weather Conditions	Monitoring Locations & Key On-site Environmental Information
Sunday May 18	DA,ML,TJ	Sunny	<p>Laydown Area at 38km of the Lillooet FSR</p> <ul style="list-style-type: none"> Fuel storage area containment construction <p>ULRHEF Powerhouse</p> <ul style="list-style-type: none"> Bench excavation and material hauling <p>Truckwash Creek Bypass – FSR realignment</p> <ul style="list-style-type: none"> Bulk excavation and road works outside of the Mountain Goat Migration Corridor 200m buffer
Monday May 19	DA,ML,TJ	Sunny	<p>Laydown Area at 38km of the Lillooet FSR</p> <ul style="list-style-type: none"> Fuel storage area containment construction completed <p>ULRHEF Powerhouse and Access Road</p> <ul style="list-style-type: none"> Bench excavation and material hauling at powerhouse location Clearing, stripping and grubbing along the access road <p>BDRHEF Portal and Powerhouse Access Road</p> <ul style="list-style-type: none"> Access road construction Installation of water withdrawal station at Boulder Creek <p>Explosive Magazine Storage Area</p> <ul style="list-style-type: none"> Lock block assembly and final grade construction completed <p>Truckwash Creek Bypass – FSR realignment</p> <ul style="list-style-type: none"> Bulk excavation and road works began along entire length of the work area (within the Mountain Goat Migration Corridor 200m buffer)
Tuesday May 20	DA,ML,TH, TJ,VD	Sun and Cloud	<p>ULRHEF Powerhouse and Access Road</p> <ul style="list-style-type: none"> Bench excavation and material hauling at powerhouse location Clearing, stripping and grubbing along the access road <p>BDRHEF Portal and Powerhouse Access Road</p> <ul style="list-style-type: none"> Access road construction <p>Truckwash Creek Bypass – FSR realignment</p> <ul style="list-style-type: none"> Bulk excavation and road works continued <p>TX-Line</p> <ul style="list-style-type: none"> Segment 3 clearing Segment 1 & 2 access road and pole installation construction Culvert installation along Pebble D.1 Branch road
Wednesday May 21	DA,MS,TJ	Sun and Cloud	<p>ULRHEF Powerhouse and Access Road</p> <ul style="list-style-type: none"> Removing/decking fallen trees along the access road alignment <p>BDRHEF Portal and Powerhouse Access Road</p> <ul style="list-style-type: none"> Portal bulk excavation and access road construction <p>Truckwash Creek Bypass – FSR realignment</p> <ul style="list-style-type: none"> Bulk excavation, blasting and road works continued on east and west headings <p>TX-Line</p> <ul style="list-style-type: none"> Road and drainage repairs/upgrades continued along Pebble Creek Main Line road and branch roads beyond the CRT-ebc construction camp Pole installation began in Segment 1 & 2

Date	IEM Team Personnel	Weather Conditions	Monitoring Locations & Key On-site Environmental Information
Thursday May 22	DA,MS,TH, VD	Sun and Cloud	<p>ULRHEF Powerhouse and Access Road</p> <ul style="list-style-type: none"> Removing/decking fallen trees along the access road alignment <p>BDRHEF Portal and Powerhouse Access Road</p> <ul style="list-style-type: none"> Portal bulk excavation Access road excavation completed <p>Truckwash Creek Bypass – FSR realignment</p> <ul style="list-style-type: none"> Bulk excavation and road works outside of the Mountain Goat Migration Corridor 200m buffer <p>TX-Line</p> <ul style="list-style-type: none"> Road and drainage repairs/upgrades continued along Pebble Creek Main Line road and branch roads beyond the CRT-ebc construction camp Pole installation in Segment 1 & 2
Friday May 23	DA,MS,TH, VD	Sun and Cloud	<p>ULRHEF Downstream Portal Investigative works</p> <ul style="list-style-type: none"> Test pitting near the base of the portal location <p>ULRHEF Powerhouse and Access Road</p> <ul style="list-style-type: none"> Removing/decking fallen trees along the access road alignment <p>ULRHEF Intake</p> <ul style="list-style-type: none"> Bridge reinforcement began at 48km on non-status road (intake access road) <p>BDRHEF Portal</p> <ul style="list-style-type: none"> Portal bulk excavation <p>Truckwash Creek Bypass – FSR realignment</p> <ul style="list-style-type: none"> Bulk excavation, blasting and road works continued on east and west headings <p>TX-Line</p> <ul style="list-style-type: none"> Road and drainage repairs/upgrades continued along Pebble Creek Main Line road and branch roads beyond the CRT-ebc construction camp Pole installation in Segment 1 & 2
Saturday May 24	DA,MS,VD	Sun and Cloud	<p>ULRHEF Powerhouse and Access Road</p> <ul style="list-style-type: none"> Bench excavation at powerhouse location Hand Felling & Removing/decking fallen trees along the access road alignment <p>ULRHEF Intake</p> <ul style="list-style-type: none"> Bridge reinforcement continued at 48km of non-status road (intake access road) <p>BDRHEF Portal</p> <ul style="list-style-type: none"> Portal bulk excavation <p>Truckwash Creek Bypass – FSR realignment</p> <ul style="list-style-type: none"> Bulk excavation, blasting and road works continued on east and west headings

IEM Team Personnel: DA – Danita Abraham; ML – Mackenzie Lee; MS – Mandala Smulders; TH – Tom Hicks; TJ – Tammie Jenkins; 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.
May 20	<i>Potential archaeologically significant site investigation</i>	Arrowstone Consulting, Innergex, SES, Lil'wat Nation representatives	<ul style="list-style-type: none"> On May 16th potential archaeologically sites were identified by crews working at the ULRHEF powerhouse access road. Works were halted pending a field visit by a QP and the Lil'wat Nation. The potential archaeologically sites were visited by a QP on May 20th who performed an assessment. The sites were not deemed archaeologically significant and works were permitted to resume with the presence of an archaeological monitor. 	N/A
	<i>Pre-work meeting</i>	WEL, Mumleqs, SES, Innergex	<ul style="list-style-type: none"> Reviewed the TX - Line Construction work plan, highlighting Segment 1 & 2 specific environmental constraints. 	N/A
	<i>Pre-work meeting</i>	Mumleqs, WEL, SES, Innergex,	<ul style="list-style-type: none"> Reviewed Segment 3 Clearing work plan, highlighting Segment 3 specific environmental constraints. 	N/A
	<i>Site meeting</i>	MFLNRO, Innergex, SES	<ul style="list-style-type: none"> Visited Keyhole Falls Mountain Goat Monitoring site (OBS02) to review Grizzly Bear sighting locations with the MFLNRO Ecosystem Biologists. 	N/A
May 23	<i>Pre-work meeting</i>	CRT-ebc, SES	<ul style="list-style-type: none"> Reviewed the ULRHEF downstream portal area test pitting work plan, and reviewed active nest locations identified in AMBNS. 	N/A
	<i>Pre-work meeting</i>	CRT-ebc, SES, Innergex, Ecofish	<ul style="list-style-type: none"> Reviewed the Keyhole Falls bridge work plan (48km of non-status intake access road). 	N/A
	<i>Email Notification EIR#001</i>	CRT-ebc, SES, Innergex, Ecofish	<ul style="list-style-type: none"> The IEM was notified via email of a tree felled containing a potentially active bird nest at the BDRHEF powerhouse access road. Details of the incident will be appended to the weekly report once the environmental incident report (EIR#001) is finalized by CRT-ebc and reviewed/accepted by the IEM. 	ULR#003
	<i>Onsite incident response EIR#002</i>	CRT-ebc, SES	<ul style="list-style-type: none"> The IEM was immediately notified and helped direct and document incident response following a log box culvert failure on the non-status road portion 47km of the Lillooet River FSR. Details of the incident will be appended to the weekly report once the environmental incident report (EIR#002) is finalized by CRT-ebc and reviewed/accepted by the IEM. 	ULR#004

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>ULRHEF, BDRHEF, and Tx Line</i>	<i>All ULRHEF BDRHEF, and Tx Line areas</i>	<i>Nesting Birds</i>	<i>Vegetation clearing must take place outside of the breeding bird season (May 1 – July 31) to prevent disturbance of bird nests. If not feasible, nest surveys must be conducted by qualified professionals following the Active Migratory Bird Nest Surveys prior to clearing and protective buffers surrounding discovered nests will be maintained until young are fledged and approval has been obtained from the IEM or designate.</i>
<i>Tx-Line</i>	<i>Segment 3</i>	<i>Suitable Raptor Nesting Habitat</i>	<i>IEM presence is required when clearing within suitable Northern Goshawk (NOGO) and SPOW (Spotted Owl) nesting habitat during the breeding period.</i>
<i>ULRHEF powerhouse</i>	<i>Within 50m of identified archeologically significant area</i>	<i>Archaeologically significant site EdRu-3</i>	<i>The ASMP recommends that an archaeological technician from the Lil'wat Nation be present to monitor initial ground-disturbance activities within 50 m of the EdRu-3 site boundaries.</i>
	<i>Within 30m of the Upper Lillooet River</i>	<i>Riparian area</i>	<i>IEM presence is required when working within 30m of the Upper Lillooet River as outlined in the ULRHEF Powerhouse Stripping and Grubbing work plan.</i>
<i>Lillooet River FSR; ULRHEF intake access; FSR realignment at Truckwash Creek</i>	<i>Access roads above the lower limit of the 200m buffer Truckwash Creek Migration Corridor to the ULRHEF intake; including FSR realignment at Truckwash Creek</i>	<i>Mountain Goat UWR</i>	<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>Snow depths measured on May 3, 2014 resulted in the implementation of the 2 week spring shutdown as detailed in the Mountain Goat Management Plan. The spring shutdown was lifted on May 18th; additional information is provided in Section 8.0.</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> <p><i>In May, daily operational shutdowns within 200 m of GWR (u-2-002 UL 11, UL 19) and migration corridor will be implemented to allow migrating Mountain Goats to access valuable habitat. Shutdowns will occur 1 hour before and 2 hours after sunrise, and 2 hours before and 1 hour after sunset).</i></p>

4.0 Boulder Creek Hydroelectric Facility

4.1 Monitoring Results

4.1.1 Active Construction Areas

Construction Camp

- Camp trailers and equipment continued being hauled to site this week. Installation of the camp facilities is pending. No environmental concerns were noted.

38km Laydown

- A fuel storage containment area was constructed this week. No spills or leaks were noted.

Explosive Magazine Area

- The protective soil berm, lock block retaining wall and loading deck, as well as the final road capping were completed on May 19th, 2014. A concrete slab will be poured at the loading deck in the coming weeks.

BDRHEF Downstream Portal and Powerhouse Access Road

- Bulk excavation of the access road alignment and portal location began following stripping and grubbing of organic material, and continued for the remainder of the week at the portal location. Once the access road alignment was finalized an access road was constructed to the Boulder Creek water withdrawal site authorized in Short Term Water Use Approval (No.A2006123). The 3" intake pump was outfitted with a 1/4" mesh fish screen and was powered by a generator. Water was used by a water truck for dust suppression along the FSR and construction access roads.

Environmental Summary:

- The IEM was onsite to monitor the construction of the road accessing the water extraction point. The pump was installed in Boulder Creek and the inlet was outfitted with 1/4" wire mesh. The generator was double walled and stored within secondary containment.
- No blasting occurred in the area this week and no water quality concerns were noted.
- On May 23rd, 2014, the IEM was notified via email of a tree felled containing a potentially active bird nest at the BDRHEF powerhouse access road (EIR#001). The environmental incident has been included in the ITM as ULR#003. Further details of the incident, potential environmental impacts, action items and targeted completion dates will be appended to the WEMR and updated in the ITM once the EIR is finalized by CRT-ebc and reviewed/accepted by the IEM.

Photos:



Photo 1. Bulk excavation of the BDRHEF downstream portal location (May 23, 2014).



Photo 2. Road used by the water truck to access the water extraction point on Boulder Creek. (May 20, 2014).



Photo 3. Boulder Creek water withdrawal site, 3" intake pump was outfitted with a 1/4" mesh fish screen (May 23, 2014).

Water Quality Results

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

5.0 Upper Lillooet River Hydroelectric Facility

5.1 Monitoring Results

5.1.1 Active Construction Areas

ULRHEF Powerhouse and Access Road

- Clearing of the powerhouse access road resumed on May 20th following a review of the AMBNS results and a field visit from the Lil'wat Nation and Arrowstone Consulting, who confirmed that the site did not contain a potentially significant archaeological site. Following the completion of hand falling in the area, Mumlegs began yarding and decking merchantable timber road side along the FSR.
- Bench excavation at the ULRHEF continued outside of 30m from the Lillooet River this week. Material from the excavation was used on road surfaces of the FSR, and the Explosive Magazine Access Road. No environmental concerns were noted.

ULRHEF Intake and access roads

- Re-enforcement of the bridge deck located at 48km of the non-status road (the Keyhole Bridge), began on May 23rd, following the kick-off meeting.

Truckwash Creek Bypass Road - FSR Re-alignment

- Bulk excavation and road works occurred throughout the reporting period on the eastern portion and western portion of the road alignment. Construction was permitted within the Mountain Goat Migration Corridor 200m buffer, after May 18th once the two week minimum spring shutdown period had elapsed. Drainage ditch installation occurred in the dry, and no additional vegetation clearing occurred as part of the works.

Environmental Summary:

- Noise monitoring stations were installed and were operational once work began within the Mountain Goat Migration Corridor 200m buffer at Truckwash Creek on May 19th. A preliminary inspection of the data suggested that noise level thresholds were exceeded as a result of blasting activities that occurred on May 21st and 23rd. These exceedances were short lived and were only observed at the lower Truckwash Creek station. No exceedances of the 75db noise threshold were recorded at the upper station. Construction at the downstream portal location associated with test pitting also resulted in temporary exceedances of the 75db noise level threshold as recorded at the lower Truckwash Creek station. Exceedances recorded during this work activity were the result of the tracking of the excavator and from drilling activities.
- On May 23rd, 2014, the IEM was immediately notified in the field and helped direct and document environmental incident response following a log box culvert failure at 47km of the Lillooet River FSR (EIR#002). The environmental incident has been included in the ITM as ULR#004. Further details of the incident, potential environmental impacts, action items and targeted completion dates will be appended

to the WEMR and updated in the ITM once the EIR is finalized by CRT-ebc and reviewed/accepted by the IEM.

Photos:



Photo 4. Results of clearing along the ULRHEF powerhouse access road. (May 23, 2014).



Photo 5. Keyhole Bridge re-enforcement works. (May 24, 2014).

Water Quality Results

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

5.2 Recommendations

Recommend revising blasting procedures at the Truckwash creek work area ensure the 75db noise level threshold is not exceeded.

5.3 Upcoming Works

Clearing and construction associated with the intake diversion area scheduled to begin next week at the ULRHEF intake. Bulk excavation of the BDRHEF portal will proceed until rock is encountered that requires blasting. Bench excavation at the ULRHEF powerhouse and removing trees from the access road is scheduled to continue next week.

6.0 Transmission Line

6.1 Monitoring Results

6.1.1 Active Construction Areas

Pebble Main and Branch Road D.1 Upgrades

- Road upgrade work continued along Pebble Main Branch Road D.1 and began along the Athel Main spur road Cross drains and ditch upgrades were performed

within NCDs to eliminate surface flows over the access roads. One permanent culvert was installed on May 20th to convey a previously unidentified drainage (non-fish bearing) through the newly constructed access road (Pebble Branch D.1).

Segment 1 & 2

- Pole installation and dressing began in Segments 1 and 2 this week. Temporary access tracks to the pole locations were constructed. No environmental concerns were noted.

Segment 3

- Clearing was completed in Segment 3 following the completion of AMBNS. The IEM was present during clearing activities within NOGO and SPOW suitable nesting habitat. No raptors were observed during the monitoring of clearing activities and all flagged boundaries were respected.

Environmental Summary:

- Culvert installation works were performed in the dry by using a pump to divert water around the work area. The IEM was onsite for the duration of the culvert installation works to monitor activities and document adherence to water quality guidelines. Water quality results are summarized below. No water quality concerns were noted

Photos:



Photo 6. Dewatering of the work area during the culvert installation; Pebble D.1 Branch road (May 20, 2014).



Photo 7. Pole installation work in Segment 1 (May 23, 2014).

Water Quality Results

Date	Time	Sample Location Description	pH	Turbidity (NTU)	Temperature (°C)
May 20	12:23	Background – upstream	-	1.63	-
	12:25	Downstream – during culvert install	-	3.66	-
	12:45	Downstream – during culvert install	-	2.89	-
	13:00	Downstream – culvert commissioning	-	1.78	-

6.2 Recommendations

No recommendations are provided for this reporting period.

6.3 Upcoming Works

Transmission line access road upgrades will continue next week and pole installation and dressing is scheduled to continue in Segment 1 and 2 next week. Clearing is scheduled to continue in Segment 3 and begin in Segment 5 following the results of AMBNS. Upcoming transmission line works will be focused on road construction, pole installation, and completing the clearing within the Segments 1-5.

7.0 Wildlife Sightings

As per the CEMP, a wildlife sightings record has been implemented and will be updated regularly by Project Personnel. It is mandatory for all personnel to report wildlife sightings including, but not limited to bears, cougars, mountain goats and deer. Wildlife sighting will be reported and recorded by the contractor(s) and will be 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

Two Grizzly Bear sightings were reported during this monitoring period (May 18th and 20th). All parties identified in the above table were notified within 24hr of the sighting log submission to the IEM. The sighting logs are appended to this report.

All parties identified in the above table were notified within 48hr of the Mountain Goat monitoring form submission. Mountain goat monitoring forms are appended to this report.

8.0 Mountain Goat Monitoring Program

The minimum 2-week spring shutdown to permit Mountain Goat migration between UL11 & UL19, ended May 18th, 2014. Work above and within the Migration Corridor resumed on May 19th, according to conditions outlined in the CEMP and Mountain Goat Management Plan, and following approval from the IEM. Although the spring shutdown period has ended the following mitigation measures must be implemented as work in the area resumes;

1. Daily dawn and dusk shutdowns for the remainder of May as outlined in the Mountain Goat Management Plan.
2. Mountain Goat monitoring when works are occurring within 500m of Mountain Goat habitats and migration routes.
3. Noise level monitoring to ensure that the 75db noise level threshold is not exceeded as outlined in the Mountain Goat Management Plan.
4. Works must be immediately suspended and the IEM notified if Mountain Goats are observed within 500m of the line of sight of work activities. Works will resume in consultation with the IEM.

Based on the last week of goat monitoring observations and the snow levels within the migration corridor and the upper range, it is apparent that Mountain Goats are capable of accessing and utilizing the upper range habitats at this time. We have observed and recorded fresh Mountain Goat tracks within the migration corridor within the past week, and have been provided photographic evidence (from wildlife cameras) demonstrating that Mountain Goats began utilizing the habitat as early as March 15th. We are confident that with continued diligence by CRT-ebc crews and with the implementation of the mitigation measures summarized above, that works within and beyond the migration corridor are possible without adverse impacts to the local Mountain Goat population within UL11 & UL19.

As of May 19th, the IEM reinitiated a Mountain Goat Monitoring program as works resumed within the Mountain Goat Migration Corridor at Truckwash creek and near the ULRHEF intake. The IEM or designate was on site to monitor Mountain Goat activity within 500 m of construction activities at the Truckwash Creek Bypass road, and Keyhole bridge reinforcement works. Mountain Goats were monitored from three 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).

Monitoring effort will be split between all three sites between sunrise and sunset, unless safety concerns precluding from doing so. The order of site visits will rotate daily. 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 construction 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.

9.0 Environmental Issues Tracking Matrix (ITM)

9.1 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
ULR#3	Open	BDRHEF powerhouse access road	Tree fallen containing potentially active bird nest (EIR001). <i>(further information will be included in the EIR once finalized)</i>	<ol style="list-style-type: none"> CRT-ebc to prepare an EIR detailing the cause, description and actions items related to the incident. IEM to review and approved the EIR. 	May 23, 2014	May 26, 2014	-
ULR#4	Open	47km – Lillooet River FSR	A log box culvert failed while being crossed by an excavator (EIR002). <i>(further information will be included in the EIR once finalized)</i>	<ol style="list-style-type: none"> CRT-ebc to prepare an EIR detailing the cause, description and actions items related to the incident. IEM to review and approved the EIR. 	May 23, 2014	May 26, 2014	-

9.2 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>							

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT



Goat Monitor's Name(s):

Date (YYYY-MM-DD):

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

Weather (cloud cover, precipitation and temperature):

Submit completed **Mountain Goat Daily Observation Form** to by email to **goats@sartorienv.com** following each day of monitoring. Please ensure forms are complete and saved in the appropriate format (YYYY-MM-DD_Goat Monitoring Daily Observation Form (Observers Initials))

Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates (approx. center of area)	Daily Start Time (24hr clock)	Daily End Time (24hr clock)	Daily form #	1	of	2
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	12:00	14:00				
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	9:50	11:50				
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	7:40	9:40				

If more space is needed in the below table, please fill out additional daily forms and indicate total number of forms above.

Observation Site (indicate if location other than OBS site)	Time (use 24hr clock)	UTM Coordinates or Waypoint (10U)	Species Observed (indicate Mountain Goat or other species)	Observations (be specific - visual sign, track, other sign)	# 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
MG -obs03	7:50	10u 469155...	Grizz	Tracks	1	Unkno wn	Unkno wn	Heading west walked over our trac	Also tracks noticed yesterday around com	475-477
MG-obs03	8:00	10u 469155 5614960	Mg	Visual	4	Unkno wn	Unkno wn	Lying on cliff edge and feeding in and out of timber line	Below snow line	0
MG-obs02	10:00	10u 466760 5613967	Grizz	Visual	3	Unkno wn	Adult female 2cubs	Feeding close to den	Cotton wooded area close to river just down from key hole fal	479-507
MG-obs02	10:15	10u 466760 5613967	MG	Visual	2	Unkno wn	Adult	Appears restless 1goat stands then lays ,stands then lay	Just above grizz	0

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT



Goat Monitor's Name(s): DA, TJ

Date (YYYY-MM-DD): 2014-05-19

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

Weather (cloud cover, precipitation and temperature): Overcast

Submit completed **Mountain Goat Daily Observation Form** to by email to goats@sartorienv.com following each day of monitoring. Please ensure forms are complete and saved in the appropriate format (YYYY-MM-DD_Goat Monitoring Daily Observation Form (Observers Initials))

Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates (approx. center of area)	Daily Start Time (24hr clock)	Daily End Time (24hr clock)	Daily form #	1	of	2
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	07:30	09:30				
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	11:45	1:45				
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	9:35	11:35				

If more space is needed in the below table, please fill out additional daily forms and indicate total number of forms above.

Observation Site (indicate if location other than OBS site)	Time (use 24hr clock)	UTM Coordinates or Waypoint (10U)	Species Observed (indicate Mountain Goat or other species)	Observations (be specific - visual sign, track, other sign)	# 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
MG-OBS01	07:35	10U 467898 56	MG	Tracks , scat	Unkwn	Unkwn	Unkwn	Heading down east in the Truckwash tra	Tracks and scat go down behind observati	508-514
MG-OBS03	09:37	10U 46955 5614960	MG	Visual	5	Unkwn	Unkwn	Feeding and lying down some Goats are moved to	2mg on right side of bluffs and 3 to the left of valley all below sno	
MG-obs02	11:45	10u 446760 5613967	GB	Tracks	1	Unkwn	Unkwn	Tracks found on trail in to keyhole falls observation site	Tracks noticed on trail on the snow	
MG-obs02	12:55	10u 446760 5614960	Grizzly cubs	Visual	2	Unkwn	Unkwn	Feeding and playing in cotton wood trees	4people approx 100 meters away from cubs we could not spo	

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT



Goat Monitor's Name(s):

Date (YYYY-MM-DD):

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

Weather (cloud cover, precipitation and temperature):

Submit completed **Mountain Goat Daily Observation Form** to by email to goats@sartorienv.com following each day of monitoring. Please ensure forms are complete and saved in the appropriate format (YYYY-MM-DD_Goat Monitoring Daily Observation Form (Observers Initials))

Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates (approx. center of area)	Daily Start Time (24hr clock)	Daily End Time (24hr clock)	Daily form #	1	of	1
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	07:30	09:30				
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	9:45	11:45				
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	11:55	1:55				

If more space is needed in the below table, please fill out additional daily forms and indicate total number of forms above.

Observation Site (indicate if location other than OBS site)	Time (use 24hr clock)	UTM Coordinates or Waypoint (10U)	Species Observed (indicate Mountain Goat or other species)	Observations (be specific - visual sign, track, other sign)	# 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
MG-OBS01	7:40	10U467898 5612845	0	NA	0	0	0	NA	Loud construction activity. Machines and	552
MG-OBS02	09:50	10U 466760 5613967	MG	Visual	3	1 nanny, 2 yearlii	1 female, 2 unkl	Licking mineral salts	Once they noticed us the went and hid behind ledge.	553
MG-OBS03	12:00	10U 469155 5614960	MG	Tracks	1	Unknwn	Unknwn	Heading east,	On side of Pumice rd	554
MG-OBS03	12:30	10U 469155 5614960	MG	Visual	2	UnKno wn	Unkno wn	Laying down	Moved to snowline	0

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT



Goat Monitor's Name(s):

Date (YYYY-MM-DD):

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

Weather (cloud cover, precipitation and temperature):

Submit completed **Mountain Goat Daily Observation Form** to by email to goats@sartorienv.com following each day of monitoring. Please ensure forms are complete and saved in the appropriate format (YYYY-MM-DD_Goat Monitoring Daily Observation Form (Observers Initials))

Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates (approx. center of area)	Daily Start Time (24hr clock)	Daily End Time (24hr clock)	Daily form #	1	of	1
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	10:20	12:20				
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	7:45	9:45				
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	10:00	10:05				

If more space is needed in the below table, please fill out additional daily forms and indicate total number of forms above.

Observation Site (indicate if location other than OBS site)	Time (use 24hr clock)	UTM Coordinates or Waypoint (10U)	Species Observed (indicate Mountain Goat or other species)	Observations (be specific - visual sign, track, other sign)	# 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
MG-ob502	9:20	10U 466760 5612845	Mountain goat	Visual	1	Adult	Nanny	Eating at the top of cliff	No snow, a lot of new green and plant	540
MG-OBS02	10:00	10U 469155 5613967	None	None	N/A	N/A	N/A	N/A	Too cloudy. Zero Visibility	iPad 297
MG-OBS01	10:20	10U467898 5612845	Mountain goat	Fresh grizzly and goat tracks	1 goat 1 grizzly	Unknwn	Unknwn	On the trail are the tracks to the monitor site	New small shrubs no more snow	
MG-OBS01	11:20	10U467898 5612845	Black tailed deer	Black tailed deer and grizzly scat	1 deer	Young	Doe	Black tail deer walked by, grizzly scratches on near by	No snow. New small shrubs present	iPad 297-302

Mountain Goat Daily Observation Form

UPPER LILLOOET HYDRO PROJECT



Goat Monitor's Name(s):

Date (YYYY-MM-DD):

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

Weather (cloud cover, precipitation and temperature):

Submit completed **Mountain Goat Daily Observation Form** to by email to goats@sartorienv.com following each day of monitoring. Please ensure forms are complete and saved in the appropriate format (YYYY-MM-DD_Goat Monitoring Daily Observation Form (Observers Initials))



Mountain Goat Observation Site	UWR/Migration Corridor - Location	UTM Coordinates (approx. center of area)	Daily Start Time (24hr clock)	Daily End Time (24hr clock)	Daily form #	1	of	2
MG - OBS01	Migration Corridor - East side of Truckwash Creek	10U 467898 5612845	9:30	11:30				
MG - OBS02	UWR u-2-002 UL 11 - Keyhole Falls	10U 466760 5613967	12:30	14:30				
MG - OBS03	UWR u-2-002 UL 19 - Garibaldi Pumice	10U 469155 5614960	7:15	9:15				

If more space is needed in the below table, please fill out additional daily forms and indicate total number of forms above.

Observation Site (indicate if location other than OBS site)	Time (use 24hr clock)	UTM Coordinates or Waypoint (10U)	Species Observed (indicate Mountain Goat or other species)	Observations (be specific - visual sign, track, other sign)	# 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
MG-OBS03	07:40	10U469155 5614960	Mountain goat	Visual	1	Adult	Billy	Foraging	No snow green	566-5
MG-OBS03	08:17	10U469155 5614960	Mountain goat	Visual	1	Adult	Billy	Foraging	No snow green	
MG-OBS03	08:25	10U469155 5614960	Mountain goat	Visual	2	Adult and kid	Nanny and kid	Foraging along the burnt trees	No snow green	
MG-OS03	08:55	10U469155 5614960	Mountain goat	Visual	1	Adult	Billy	Migrating across mountain, quickly	No snow green	

Appendix B. Bear sighting log.

BEAR OBSERVATION CARD
Return to: Local BC Parks Office

BC 9587  

14/05/18 10:00 ? 02 Keyhole falls
YY/MM/DD Time (24 hrs) District Name of Protected Area

Observer Name, Address and Phone Number: Danita Abraham Bx 318 Mt Currie Bc. -604.894.2333

Location in protected area (i.e., name of campground, campsite, dayuse area, trail name, lake, stream, nearest geographic feature, etc.): Key Hole Falls = intake

10U 466760 5613967 Elevation (metres or feet) Observer Distance (metres or feet)

U.T.M. Zone Easting or Longitude Northing or Latitude

Weather: Rain, Overcast, Cloudy, Clear Map Datum: NAD27 NAD83 GPS

Bear Species: Grizzly bear Black bear Unknown ID Confidence: High Medium Low

Colour code: Reddish-brown Black Grey Dark brown Light brown Blond Other: _____

Distinguishing features (tag, collar, scars): NONE

Abundance: Common Frequent Occasional Rare

Observation Type: sighting track scat digging hair foraging sign rub tree bed, den

Number Observed:

Adult male Adult fem. 1 Young of yr. 2 Sub-Adult Unclassified Was the bear aware of your presence? Yes No N/A

Food association: none odour unattended garbage vehicle cache

Bear(s) activity: feeding hunting fishing scavenging drinking travelling bedded courtship/mating playing call fighting Other: _____

Reaction: indifferent flee curious food seeking illegally fed threatening charge rut fight play travel Other: _____

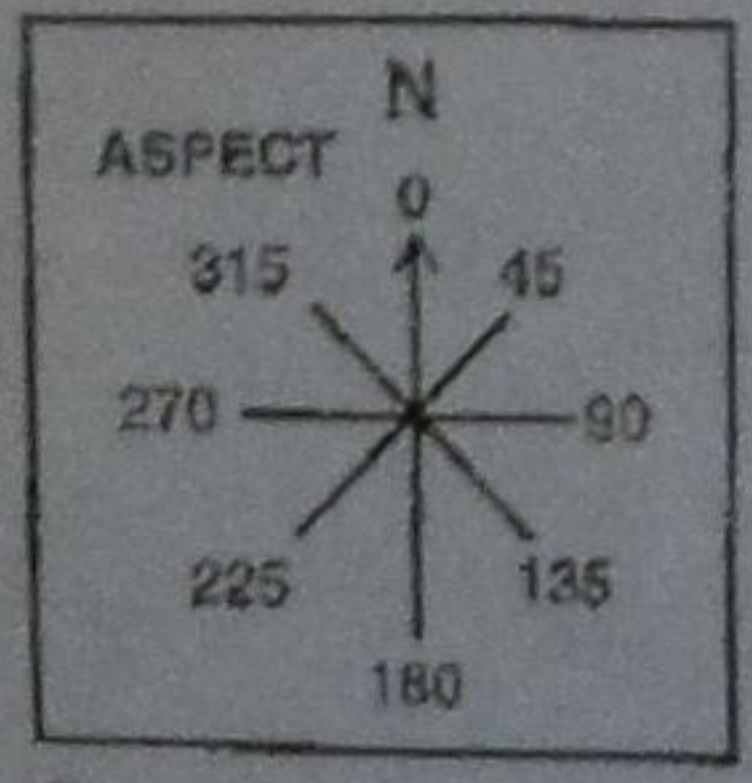
Estimated level of habituation: a) sighting or sign b) normal behaviour - avoids people c) reacts defensively after surprise or provocation d) tolerates but ignores people e) shows repeated interest in people f) habituated to people and their food g) displays aggressive behaviour, threat to humans h) unknown

Repeat offender: Yes No

If yes, provide background information (i.e., complaint/occurrence report) _____

Photographs: Yes No

Aspect Diagram



Notes: Refer to Mountain Goat observation forms. Saw and two cubs spotted in the grassland, wind in her favor, looked up at techs, and receded with cubs into trees.

Slope _____%

N.B. Ensure complaint / occurrence report and BC problem wildlife form (if required) are completed, if there was property damage or if further action required in dealing with bear sighting, i.e., destroy, relocation or aversive conditioning.

Appendix B. Bear sighting log.

BEAR OBSERVATION CARD

Return to: Local BC Parks Office



BC 9587



14 06 20
YY/MM/DD

12 55
Time (24 hrs)

02
District

Keyhole falls. 604 894-1967

Observer Name, Address and Phone Number: Tammie Jenkins Box 6103 MtCurrie BC V0N 2K0

Location in protected area (i.e., name of campground, campsite, dayuse area, trail name, lake, stream, nearest geographic feature, etc.) 48 km Keyhole falls.

Elevation (metres or feet) 100 466760 5613967 Observer Distance (metres or feet)

U.T.M. Zone Easting or Longitude Northing or Latitude
Weather: Rain, Overcast, Cloudy, Clear Map Datum: NAD27 NAD83 GPS

Bear Species: Grizzly bear Black bear Unknown ID Confidence: High Medium Low

Colour code: Reddish-brown, Black, Grey, Dark brown, Light brown, Blond, Other:

Distinguishing features (tag, collar, scars): None

Abundance: Common, Frequent, Occasional, Rare

Observation Type: sighting, track, scat, digging, hair, foraging sign, rub tree, bed, den

Number Observed: Adult male Adult fem. Young of yr. 2 Sub-Adult Unclassified

Was the bear aware of your presence? Yes No N/A ~~unknown~~

Food association: none, odour, unattended garbage, vehicle, cache

Bear(s) activity: a) feeding b) hunting c) fishing d) scavenging e) drinking f) travelling g) bedded h) courtship/mating i) playing j) call k) fighting Other: in cotton woods.

Reaction: a) indifferent b) flee c) curious d) food seeking e) illegally fed f) threatening g) charge h) rut i) fight j) play k) travel Other:

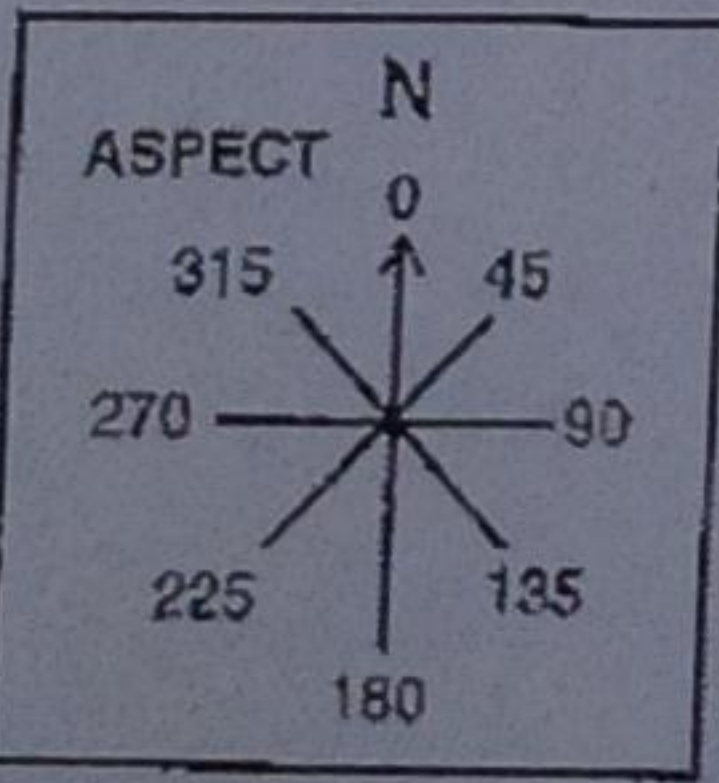
Estimated level of habituation: a) sighting or sign b) normal behaviour - avoids people c) reacts defensively after surprise or provocation d) tolerates but ignores people e) shows repeated interest in people f) habituated to people and their food g) displays aggressive behaviour, threat to humans h) unknown

Repeat offender: Yes No

If yes, provide background information (i.e., complaint/occurrence report)

Photographs: Yes No

Aspect Diagram Notes: cubs playing in cotton woods



4 people down along falls approx 100 meters from cubs we could not spot mother Griz. People were unaware.

N.B. Ensure complaint / occurrence report and BC problem wildlife form (if required) are completed, if there was property damage or if further action required in dealing with bear sighting, i.e., destroy, relocation or aversive conditioning.

FM 602

Project 3396-13A
 Project Upper Lilloet
 Name Hydro Project
 Phase 2
 Date 03-Jun-14
 Staff Eric Gu

Location - Lower Truckwash

Year	Date	Start Time	End Time	Time Elapsed (hh:mm:ss)	70 dBA Exceeded (fast)				75 dBA Exceeded (fast)									
					Y/N	Number of Occurance	Times [hh:mm:(ss)]				Y/N	Number of Occurance	Times [hh:mm:(ss)]					
2014	18-May	18/05/2014 9:16	19/05/2014 0:00	14:44:37	N													
2014	20-May	20/05/2014 0:00	20/05/2014 23:59	23:59:31	Y	1	10:57					Y	1	10:57				
2014	21-May	21/05/2014 0:00	22/05/2014 0:00	23:59:33	Y	42	7:43:23 7:43:40 7:43:49 7:47:41 7:47:51 7:47:56 7:48:16 7:48:19 8:03:56 8:04:14 8:05:34 8:06:27 8:08:40 8:08:56 8:09:56 8:10:41 8:11:11 8:16:43 8:16:46 8:21:03 8:21:58 8:22:30 8:23:51 8:24:37 8:24:58 8:25:32 8:25:39 8:26:35 8:26:38 8:39:36 8:57:19 8:57:45 8:57:59 9:32:31 9:32:36 9:33:43 9:43:44 9:43:51 9:43:56 9:44:01 9:44:06 9:44:10	Y	4	7:47:41 8:26:38 8:39:36 9:32:31								
2014	22-May	22/05/2014 0:00	22/05/2014 10:44	10:44:23	Y	1	10:44					Y	1	10:44				
2014	22-May	22/05/2014 10:59	23/05/2014 0:00	13:00:56	Y	5	10:59:09 10:59:21 10:59:37 10:59:51 10:59:54					Y	5	10:59:09 10:59:21 10:59:37 10:59:51 10:59:54				
2014	23-May	23/05/2014 0:00	23/05/2014 23:59	23:59:31	Y	5	14:51 16:13:01 16:13:12 16:13:32 17:39					Y	5	14:51 16:13:01 16:13:12 16:13:32 17:39				
2014	24-May	24/05/2014 0:00	24/05/2014 13:00	12:59:54	Y	1	12:59					Y	1	12:59				
2014	24-May	24/05/2014 13:04	25/05/2014 0:00	10:55:23	Y	6	13:04:39 13:04:44 13:05:24 13:05:27 14:47:41 14:47:46					Y	6	13:04:39 13:04:44 13:05:24 13:05:27				

Location - upper Truckwash

Year	Date	Start Time	End Time	Time Elapsed (hh:mm:ss)	70 dBA Exceeded (fast)				75 dBA Exceeded (fast)									
					Y/N	Number of Occurance	Times [hh:mm:(ss)]				Y/N	Number of Occurance	Times [hh:mm:(ss)]					
2014	18-May	18/05/2014 8:10	18/05/2014 8:11	0:00:32	N													
2014	18-May	18/05/2014 8:11	19/05/2014 0:00	15:48:20	N													
2014	20-May	20/05/2014 0:00	21/05/2014 0:00	24:00:00	Y	1	0:00:05					Y	1	0:00:05				
2014	22-May	22/05/2014 0:00	22/05/2014 10:10	10:10:02	Y	3	7:54:20 10:09:19 10:09:57					Y	1	10:09:19				
2014	24-May	24/05/2014 12:48	24/05/2014 23:59	11:11:37	Y	6	12:48:28 12:48:41 12:48:45 14:48:12 14:48:48 15:34:06					Y	2	12:48:28 12:48:41				
2014	25-May	25/05/2014 0:00	26/05/2014 0:00	24:00:01	Y	3	7:38 7:48 7:49					Y	1	7:49				
2014	26-May	26/05/2014 0:00	26/05/2014 14:25	14:25:52	Y	3	13:34:46 14:25:02 14:25:46					Y	1	14:25:02				

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